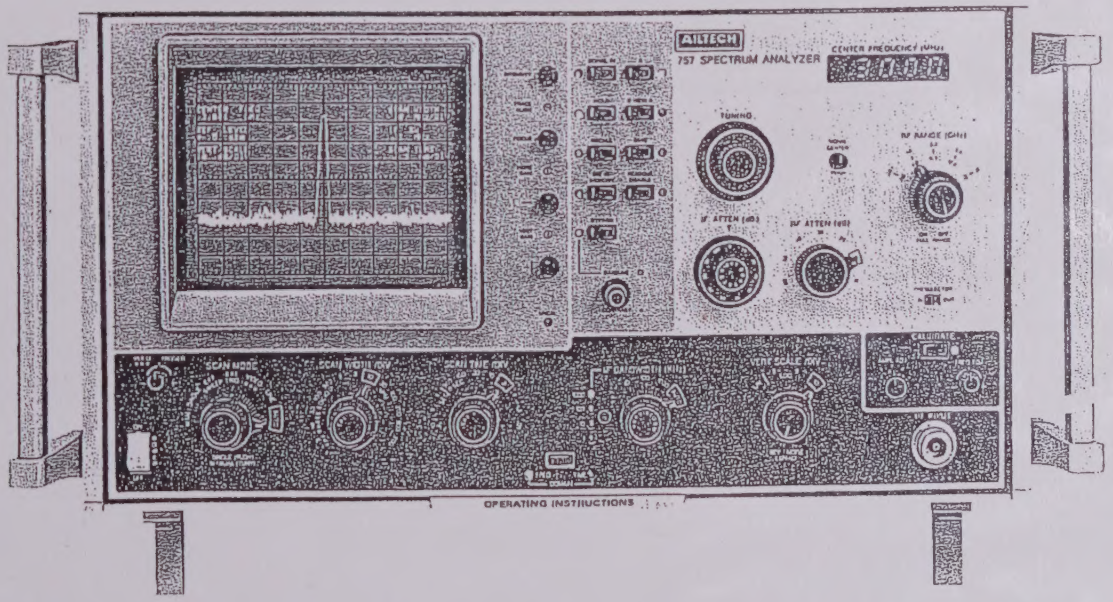
OPERATION AND MAINTENANCE MANUAL

AILTECH

757 SPECTRUM ANALYZER


AILTECH
757 SPECTRUM ANALYZER
CENTER FREQUENCY (GHz)
TUNING
RF RANGE (GHz)
IF ATTEN (dB)
RF ATTEN (dB)
CALIBRATE
SCAN MODE
SCAN WIDTH /DIV
SCAN TIME /DIV
OPERATING INSTRUCTIONS

PRINTED IN U.S.A.

SEPTEMBER 1980

EATON Advanced Electronics

Eaton Corporation
Electronic Instrumentation Division
Ronkonkoma, New York 11779

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Handbook — Part No. 296348

FOREWORD

The AILTECH 757 Spectrum Analyzer manual contains general information relating to the operational characteristics of the instrument and information required to service and maintain the instrument. Included are schematics, troubleshooting procedures, and replaceable parts list.

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SECTION 1

GENERAL INFORMATION

1-1. INTRODUCTION

1-2. This Operation and Maintenance Manual contains the necessary information to install, operate, align and troubleshoot the 757 Spectrum Analyzer. Figure 1-1 shows the 757 Spectrum Analyzer with the accessories supplied with each unit; power cable, operating instruction chart and a 50 ohm termination.

1-3. This section of the manual covers equipment description, options, specifications, periodic maintenance and safety considerations.

1-4. This manual is divided into nine sections as follows:

Section 1: General Information, contains equipment description, specifications, options, periodic maintenance and safety considerations.

Section 2: Installation, contains tools and materials required for installation, unpacking and inspection instructions, input requirements, installation procedures and initial turn-on and preliminary tests.

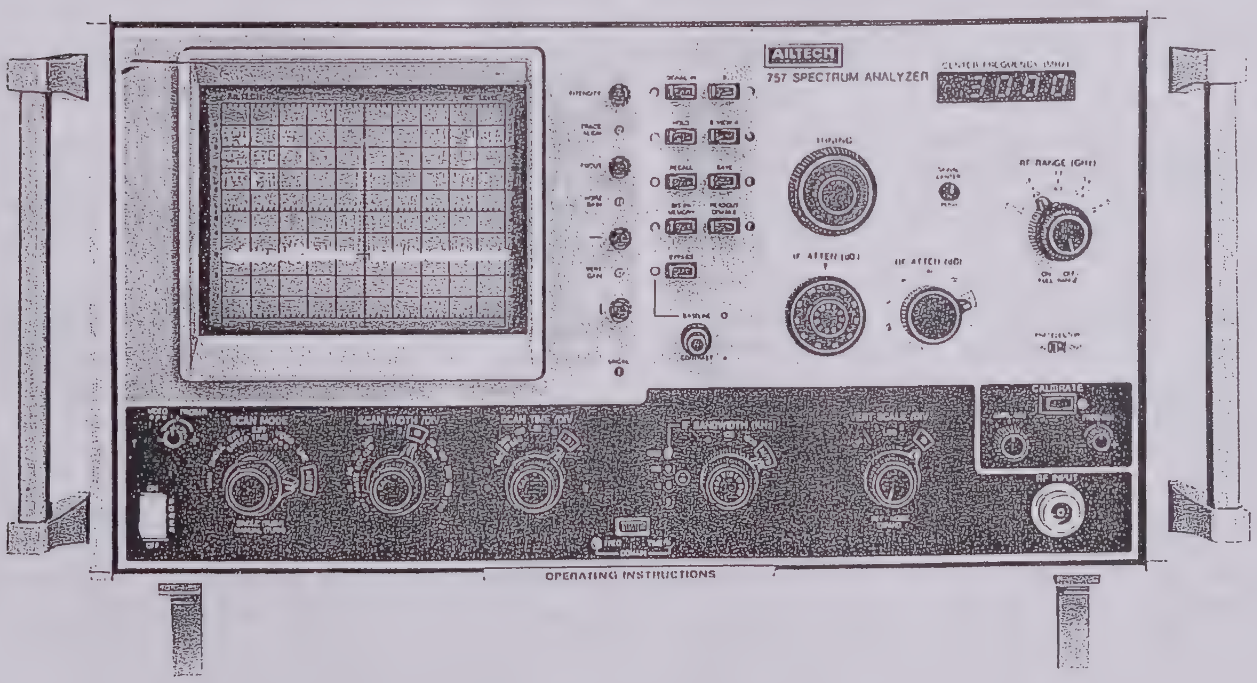

Figure 1-1. 757 Spectrum Analyzer and Accessories

Section 3: Operation, contains a description of all controls, indicators, connectors and/or jacks and operating procedures.

Section 4: Performance Test and Calibration, contains equipment requirements, preliminary operations and calibration procedures.

Section 5: Functional Description, contains basic operating principles and types of measurements.

Section 6: Alignments and Adjustments, contains information to properly adjust and align the instrument.

Section 7: Troubleshooting, contains troubleshooting procedures, schematic diagrams and parts location diagrams.

Section 8: Replaceable Parts List, contains information to order all parts and assemblies.

Section 9: CRT Display

1-5. EQUIPMENT DESCRIPTION

1-6. The 757 Spectrum Analyzer, shown in Figure 1-1 is a swept superheterodyne receiver capable of scanning portions of the 10 kHz to 22 GHz frequency range and presenting data consisting of voltage or power level as a function of frequency. This data is displayed on the CRT Display and is also available in digital format, outputted on rear panel connectors J14 and J15. The position of the five major controls, CENTER FREQUENCY (MHZ), SCAN WIDTH/DIV, SCAN TIME/DIV, IF BANDWIDTH (KHZ) and SCALE/DIV, as well as a power reference level, can also be viewed on the CRT Display outputted in digitized format. The instrument has four separate memory registers, and sufficient arithmetic capability to provide the user with all the necessary functions for complete signal analysis.

1-7. A fixed-tuned mode of operation is also selectable for measurements in the TIME DOMAIN mode.

1-8. OPTIONS

1-9. OPTION 001 INCREASED SENSITIVITY. A 20 dB gain amplifier is inserted in the frequency range 10 kHz to 2 GHz increasing the sensitivity to better than -125 dBm/kHz.

1-10. OPTION 002 RECEIVER. The 227 MHz IF, at a bandwidth of 10 MHz, is brought to a type BNC rear panel connector J7. The conversion loss between the RF input signal and this IF signal is typically 10 dB for fundamental mixing. This output is fixed tuned when the analyzer is operated in either the Time Domain or Phase Lock Mode.

1-11. OPTION 014 LOW BAND RANGE EXTENSION. The Low Band Range Extension to 1 KHz Option consists of 100 Hz IF Filter for improvement of signal to noise ratio and the low band 001 option to increase sensitivity from 1 KHz to 2.0 GHz.

1-12. OPTION 046 CAMERA. Provides a general purpose camera with Polaroid pack-film back for photographing the CRT screen waveforms.

1-13. OPTION 049 RACK MOUNTING ADAPTER. Consists of mounting brackets to provide a convenient means of mounting the spectrum analyzer in a standard 19 inch rack.

1-14. OPTION 050 SLIDE MOUNTING ADAPTER. Option 050 includes Option 49 and two side frames required for mounting slides. The recommended slides can be purchased from the Jonathan Manufacturing Company under Part No. 310-L-18-22.

1-15. OPTION 051 TRANSIT CASE. This option is a ruggedized shipping container for the 757 with handles for easy transport.

1-16. OPTION 080 POWERLINE. Permits operation of the analyzer at line frequencies between 50 and 400 Hz.

1-17. OPTION 100 100 HZ IF FILTER. The addition of a 100 Hz IF filter for narrow band applications. A signal to noise improvement of approximately 10 dB is achieved. The filter is selected manually via a front panel switch.

1-18. OPTION 300 300 HZ IF FILTER. The addition of a 300 Hz IF Filter for narrow band applications. A signal to noise improvement of approximately 10 dB is achieved. The filter is selected manually via a front panel switch.

1-19. SPECIFICATIONS

1-20. Instrument specifications are listed in Table 1-1. These Specifications are the performance standards or limits against which the instrument is tested.

Table 1-1. Spectrum Analyzer Specifications

FREQUENCY SPECIFICATIONS	
FREQUENCY RANGE	
Tuning Range	.001* to 22 GHz covered in 5 bands. Band 1 .001* – 2.0 GHz Band 2 1.8 – 4.0 GHz Band 3 3.3 – 8.3 GHz Band 4 5.4 – 12.4 GHz Band 5 10 – 22 GHz *Usable down to 1.0 kHz with slightly degraded performance.
Range Extension	With external converter to 60 GHz.
FREQUENCY DISPERSION	
Fixed Scan	14 calibrated positions from 1 kHz/div. to 700 MHz/div.
Variable Scan	Additional control for selection of scan widths in between calibrated values. Reduction to zero scan possible.
Full Range Scan	The entire frequency range of each band can be displayed with a frequency marker positioned by the TUNING control. A signal identified by the marker becomes the center frequency when switched out of this mode.
Time Domain	Analyzer becomes a fixed tuned (zero scan width) receiver. The demodulated signal is displayed as a function of time. Usable over entire frequency range.
FREQUENCY ACCURACY	
Digital Frequency Readout	0.2% from 2 to 22 GHz, ±6 MHz from 1 MHz to 1 GHz, ±8 MHz from 1 GHz to 2 GHz can be set to ±1 MHz at 100 MHz calibration intervals by CALIBRATE FREQ ADJ control.
Scan Accuracy	Frequency span between any two points on the display is typically within ±10% of the indicated separation.
Residual FM	Less than 200 Hz peak to peak over entire frequency range of .001 to 22 GHz when phase locked. Less than 10 kHz peak to peak for fundamental mixing (1 MHz to 4 GHz) non phase locked.

Table 1-1. Spectrum Analyzer Specifications (Continued)

<table>
<tr><th colspan="2">FREQUENCY ACCURACY
(Continued)</th></tr>
<tr><td>Noise Sidebands</td><td>For fundamental mixing with a 1 kHz IF bandwidth and 10 Hz video bandwidth.
<table><tr><th>Separation from Signal</th><th>Level Below CW Signal</th></tr><tr><td>30 kHz</td><td>70 dB</td></tr><tr><td>90 kHz</td><td>80 dB</td></tr><tr><td>300 kHz</td><td>90 dB</td></tr><tr><td>1 MHz</td><td>95 dB</td></tr></table></td></tr>
<tr><th colspan="2">FREQUENCY RESOLUTION
IF BANDWIDTH</th></tr>
<tr><td>Ranges</td><td>1, 10, 100 and 1000 kHz</td></tr>
<tr><td>Accuracy</td><td>1 kHz typically 1.3 kHz ±20%
10 kHz ±10%
100 kHz ±10%
1 MHz typically 1.5 MHz ±20%</td></tr>
<tr><td>Selection Method</td><td>Automatic selection as a function of Scan Width and Scan Time. Manual override also provided.</td></tr>
<tr><td>Selectivity</td><td>60 dB to 3 dB ratio of all filters < 5:1.
100 dB to 3 dB ratio of all filters < 10:1.
Off resonance rejection of all filters > 100 dB.</td></tr>
<tr><th colspan="2">VIDEO BANDWIDTH</th></tr>
<tr><td>Ranges</td><td>1, 10, 100 and 1000 kHz fixed, or 10 Hz to 1000 kHz variable.</td></tr>
<tr><td>Selection Method</td><td>Automatic selection of 1, 10, 100 and 1000 kHz filters with variable selector in CAL position.</td></tr>
<tr><th colspan="2">FREQUENCY DRIFT</th></tr>
<tr><td>Long Term</td><td>3 kHz per 10 minute typical in phase lock, after 1 hour warm-up.</td></tr>
</table>

Table 1-1. Spectrum Analyzer Specifications (Continued)

AMPLITUDE SPECIFICATIONS FULL SCREEN DISPLAY RANGE

Logarithmic	100, 50 and 20 dB (10 divisions)
Linear	1 uV to 10 volts (10 divisions)

SENSITIVITY

Average Noise Level in 1 KHz Bandwidth

RF Range (GHz)	Average Noise Level (dBm)
.001 – 2.0	-105*
1.8 – 4.0	-110
3.3 – 8.3	-105
5.4 – 12.4	-100
10 – 22	-90

*-125 dBm with 001 option.

Residual Responses	Less than -90 dBm referred to signal level at RF input.
Preselector	Three pole filter, normally 18 dB/octive, with 3 dB bandwidth typically 25 MHz (at 1.8 GHz) to 90 MHz (at 22 GHz). In bypass mode increase in sensitivity typically 10 dB.

Frequency Response (Flatness)

RF Range (GHz)	Response (dB) - Includes Preselector
.001 – 2.0	±1.5
1.8 – 4.0	±2.0
3.3 – 8.3	±2.5
5.4 – 12.4	±2.5
10 – 22	±3.0

Out of Range Blanking	CRT trace is automatically blanked whenever the band edges are exceeded.

ABSOLUTE CALIBRATION

	Internal calibration reference signals every 100 MHz. Power level specified at 1, 3, 5.8, 8.9 and 16 GHz. With amplitude adjust of Ref Level accurate to ±1 dB.

Table 1-1. Spectrum Analyzer Specifications (Continued)

ABSOLUTE CALIBRATION (Continued)

Maximum Input Power	+20 dBm (0.1 watt) with 0 RF attenuation +33 dBm (2.0 watts) with 20 dB or more RF attenuation.
Relative Gain Variations Between RF Ranges	±1.0 dB maximum
IF Gain Variation with Different Bandwidth Settings	±1.0 dB maximum
RF Attenuator	0 – 60 dB in 10 dB steps. Frequency response typically ±0.7 dB from .001 to 22 GHz.
IF Attenuator	0 – 110 dB in 1 dB steps. Accuracy ±0.25 dB per 10 dB steps but not more than ±1.5 dB over full range.
Log Display Accuracy	±0.2 dB/dB but not more than ±2 dB over 100 dB range.
Input Impedance	With RF attenuator at 0 dB. Typically SWR: <1.5 .001 to 2.0 GHz <1.6 1.8 to 22 GHz at analyzer tuned frequencies.

SPURIOUS RESPONSES

Second Harmonic Distortion

Frequency	Power Input	Distortion Level
.001 to 1.8 GHz	-30 dBm	-70 dB
1.8 – 22 GHz	0 dBm	-120 dB

Third Order Intermodulation Distortion

Frequency	Signal Separation	Power Input	Distortion Level
.001 – 1.8 GHz	200 kHz	-30 dBm	-90 dB
1.8 – 22 GHz	200 kHz	-30 dBm	-100 dB
1.8 – 22 GHz	100 MHz	0 dBm	-120 dB

Image Response

Frequency	Power Input	Distortion Level
.001 – 2.0 GHz	Any	Non Existent
2.0 – 22 GHz	Any	-70 dB

Local Oscillator Emission at RF Input Port (RF Attenuator Set to 0 dB)

Frequency	Emission Level
.001 – 2.0 GHz	-70 dBm typical
2.0 – 22 GHz	-75 dBm typical

LO Output: Swept LO typically from 1.7 to 4.5 GHz. Level typically 0 dBm.

Table 1-1. Spectrum Analyzer Specifications (Continued)

SCAN TIME SPECIFICATIONS	
Sweep Time	11 calibrated sweep times from .01 mSEC to 10 SEC. FREQ/TIME DOMAIN switch allows selection of time domain for all 11 calibrate positions and frequency domain for 8 calibrate positions.
Scan Time Accuracy	±10% from 10 SEC to .01 mSEC.
DISPLAY SPECIFICATIONS	
CRT Phosphor	Aluminized P31 phosphor
Graticule	10 X 10 divisions, internal (parallax free)
Viewing Area	Horizontal 4.4 in (11.18 cm) Vertical 3.35 in. (8.51 cm)
Digitizing Sweep Rates	10 sec/div through 3 ms/div
Horizontal Resolution	1024 data points
Vertical Resolution	512 data points
Digitized Waveform Display	One or two waveforms which may be in an active, stored or normalized mode.
Readout Parameters Displayed	Center Frequency, Reference Level, Vertical Scale, Scan Width, IF Bandwidth, Scan Time.
Readout Enable	The readout may be enabled in all digitized modes and in the analog mode for a sweep of 3 msec/div.
Digital Waveform Bypass	The digital waveform may be disabled on any range, however, it will automatically be disabled on sweeps of 1 msec/div through .01 msec/div.
External Digital Output	Two rear panel connectors provide the digitized waveform data and the spectrum analyzer control positions. The waveform data is available on one connector. Ten (10) bits of horizontal position data and nine (9) bits of vertical position data are presented in a binary weighted format with open collector outputs. The six sets of control position data are in binary format with open collector output. Three additional data lines are provided to indicate whether waveform data is: 1. From Channel A or B 2. From Input Memory or Recall Memory 3. Valid or Invalid A strobe line clocks the output data.

Table 1-1. Spectrum Analyzer Specifications (Continued)

DISPLAY SPECIFICATIONS (Continued)	
Remote Tuning Voltage	DC voltage ±6 volts permits tuning to any frequency in any band.'
GENERAL CHARACTERISTICS	
Temperature Range	
Operating	0° to 55°C
Storage	-40° to +75°C
Humidity	95% relative humidity 0° to 40°C
Power Requirements	
Line Voltage	115/230 Vac ±10%
Line Frequency	50/60 Hz 400 Hz Optional
Line Power	Less than 220 watts
Dimensions	
Height	8 3/4 inches (222 mm)
Width	16 3/4 inches (425 mm). Rack mount adapter available for 19 inch rack (Part No. 757-49).
Depth	21 7/8 inches (530 mm)
Weight	65 pounds (29.5 kg.)

1-21. EQUIPMENT REQUIRED BUT NOT SUPPLIED

1-22. A Service Kit is available for alignment and troubleshooting the spectrum analyzer. The Service Kit is shown in Figure 1-2 and itemized in Table 1-2 and is available from AILTECH under Part Number 296423-1.

1-23. RECOMMENDED TEST EQUIPMENT

1-24. Table 1-3 lists the recommended test equipment for Performance Testing, Acceptance Testing and Calibration of the Spectrum Analyzer.

1-25. PERIODIC MAINTENANCE

1-26. It is recommended that the Calibration Procedures of Section 4 be performed every six months, or 1000 hours of use, whichever occurs first; or whenever a major repair or replacement has been performed. If the instrument requires alignment, refer to the alignment procedures in Section 6.

1-27. SAFETY CONSIDERATIONS

1-28. The 757 Spectrum Analyzer is a Safety Class I instrument. It has been designed according to international safety standards and is supplied in a safe condition. This Operating and Service Manual contains information, cautions and warnings which must be followed by the user to ensure safe operation and to retain the instrument in a safe condition.

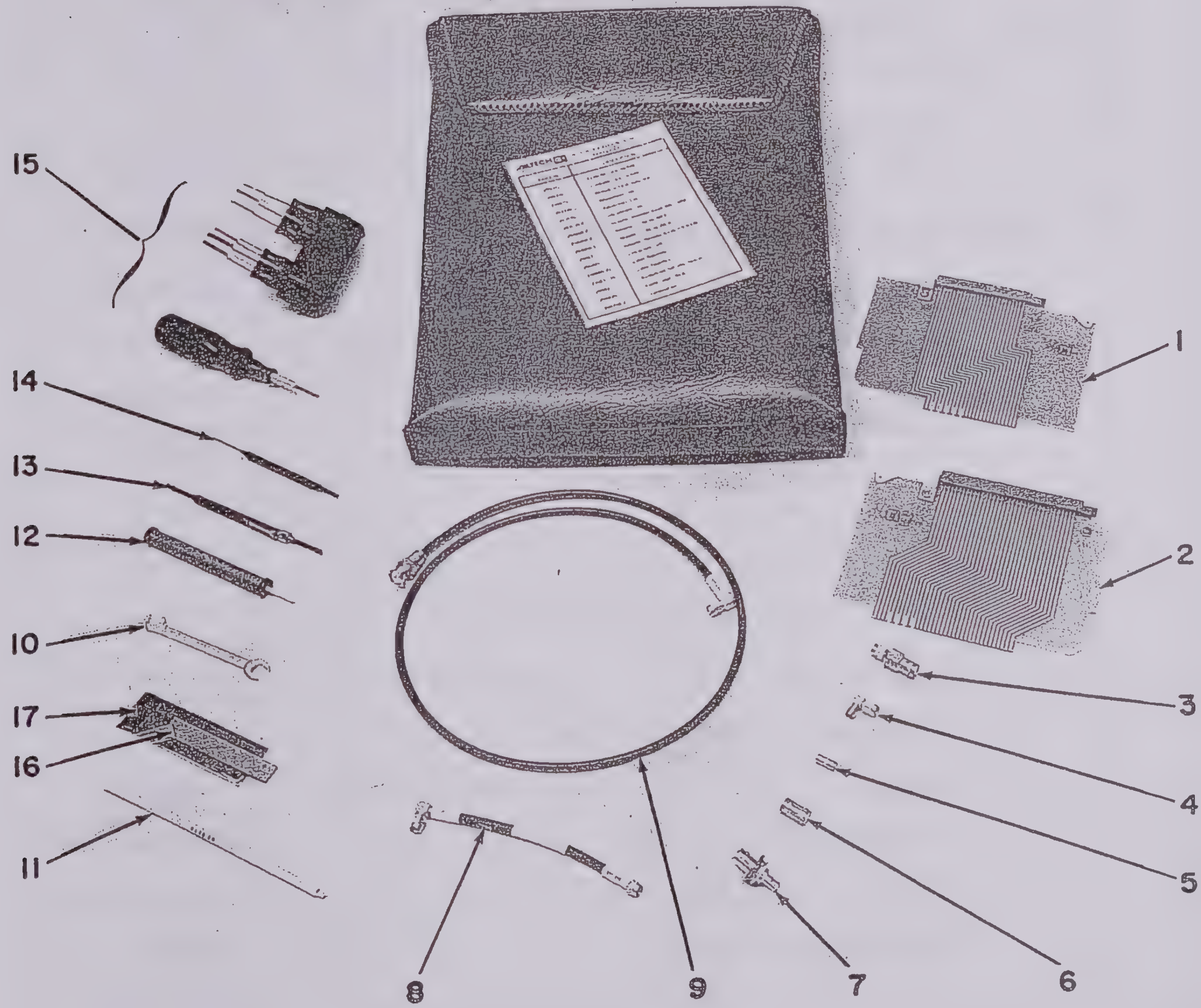
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Figure 1-2. Service Kit

Table 1-2. Service Kit Assembly P/N 296423-1

Item	Description	Part Number
	Extender Card Pouch Assembly	296423-4
1	Extender Card PC Board, 50 Pin	296312-1
2	Extender Card PC Board, 70 Pin	296314-1
	Adapter Pouch Assembly	296423-5
3	Adapter, BNC Female – SMA Male	294658-2
4	Adapter, Right Angle – SMA – SMA Female	294658-2
5	Adapter, SMA Female – SMA Female	294654-1
6	Termination, BNC Male	294798-2
7	Adapter, BNC Female – SMB Male	294677-1
	RF Cable Pouch Assembly	296423-6
8	Cable, Flex, SMA Male – SMA Right Angle Male	298505-22
9	Cable, Flex, SMA Male – BNC Male	230617-15
	Small Tool Pouch Assembly	296423-7
10	Wrench, Open End 5/16"	296419-1
11	Adjustment Tool	293198-3
12	Adjustment Tool, Non-Metallic	293198-1
13	Adjustment Tool	293198-4
14	Extraction Tool	294491-1
15	Screwdriver Set, Hex Socket	296421-1
16	Feeler Gage, 0.013 Thickness	296420-1
17	Case Feeler Gage	296422-907

Table 1-3. Recommended Test Equipment

Equipment	Specification	Recommended Equipment
Signal Generator	Frequency 1 MHz to 1 GHz, 5 kHz min. resolution Stability ±100 Hz	AILTECH 360 Frequency Synthesizer
Sweep Signal Generator	Frequency 100 MHz – 18 GHz Internal Leveling, Manual Sweep Control	AILTECH 6600/9514D/9515D
Sweep Signal Generator	Frequency 1 MHz – 100 MHz Manual Sweep Control	Wavetek 2000
Sweep Signal Generator	Frequency 18 – 22 GHz	Hewlett Packard 8690/8696
Function Generator	Frequency 0.1 Hz – 100 kHz	Wavetek 180
Comb Generator	Frequency 100 MHz – 20 GHz Signal spacing 100 MHz	AILTECH 70790
Precision Attenuator	Frequency 21.4 MHz Accuracy ±1 dB Range 80 dB	AILTECH 3220-2
Step Attenuator	Frequency 21.4 MHz Accuracy ±.5 dB Range 100 dB – 10 dB steps 10 dB – 1 dB steps	Hewlett Packard 355D
Power Meter	Frequency 1 MHz – 18 GHz	Boonton 42B/41-4E
Counter	Frequency DC-100 kHz	Systron Donner 6150
Frequency Meter	Frequency Range 1 – 4 GHz	Hewlett Packard 536A
Frequency Meter	Frequency Range 4 – 12.4 GHz	Hewlett Packard 537A
Frequency Meter	Frequency Range 12.4 – 18 GHz	Hewlett Packard 532A
Termination	50 ohm	Omni Spector 3001-61-00-0
Comb Generator	Frequency Increment 1, 10, 100 MHz Frequency Accuracy ±.01%	Hewlett Packard 8406
Oscilloscope	Bandwidth DC-200 MHz	Tektronix 475A
Oscilloscope	Differential Input 200 mv/div.	Tektronix 502
Digital Multimeter	4½ Digits Readout	Systron Donner 7004A

Table 1-3. Recommended Test Equipment (Continued)

Equipment	Specification	Recommended Equipment
Resistive Decade Box	1 MΩ Maximum Resistance	General Radio Type 1433B
Tracking Generator	Frequency Range .001 – 12.4 GHz	AILTECH 70727

1-30. SAFETY PROCEDURES

WARNING This symbol designates precautionary actions which must be followed to avoid the possibility of injury or death.

WARNING

1. If this instrument is to be energized via an auto-transformer for voltage reduction, make sure that the common terminal is connected to the earthed pole of the power source.
2. The power cable plug shall be inserted into a socket outlet provided with a protective earth contact. The protective action must not be negated by the use of an extension cord without a protective conductor (ground).
3. Before switching on the instrument, the protective earth terminal of the instrument must be connected to a protective conductor of the power cord. This is accomplished by ensuring that the instrument's internal earth terminal is correctly connected to the instrument's chassis and that the power cord is wired correctly.
4. Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any unintended operation.
5. Any interruption of the protective (ground) conductor, inside or outside the instrument, or disconnection of the protective earth terminal, is likely to make the instrument dangerous. Intentional interruption is prohibited.
6. Make sure that only fuses with the required rated voltage and current, and of the specified type (normal blow, time delay, etc.), are used for replacement. The use of repaired fuses and the short-circuiting of fuseholders must be avoided. Remove line cord before changing fuses.
7. Any adjustment, maintenance, and repair of the opened instrument under voltage should be avoided as much as possible and, if inevitable, should be carried out only by a skilled person who is aware of the hazard involved.
8. Exercise extreme care when servicing the display unit. Voltages in excess of 4500 volts are used.
9. Capacitors inside the instrument may still be charged even if the instrument has been disconnected from its source.
10. Handle the CRT Display very carefully to avoid implosion.

CAUTION This symbol designates precautionary actions which must be followed to avoid damage to part or all of the instrument.

CAUTION

1. Verify that the line voltage selector card on the rear panel is in the correct position before connecting the power.

2. Verify that the socket for the power line cord is provided with a protective earth contact.

3. Any interruption of the protective (grounding) conductor inside or outside the instrument is likely to cause damage to the instrument. To avoid damage, this instrument and all line powered devices connected to it must be connected to the same earth ground.

4. Make sure that only fuses with the required rating, and of the specified type, are used for replacement. Fuse ratings are given on rear panel of the instrument near the fuseholder.

5. To avoid the possibility of damage to test equipment, read completely through each section before starting it. Make any preliminary control settings necessary for correct test equipment operation.

6. Do not torque the RF connectors to more than 5 inch-pounds.

SECTION 2

INSTALLATION

2-1. INTRODUCTION

2-2. This section contains unpacking and inspection instructions, handling instructions, tools and materials required for installation, input requirements, installation procedures, and initial turn-on and preliminary tests for the AILTECH 757 Spectrum Analyzer.

2-3. UNPACKING AND INSPECTION

2-4. For domestic shipments, the instrument will normally be enclosed in a plastic sheet protected by a preformed cushion of shock absorbing material and enclosed in a double wall cardboard container. No special tools will be required. Overseas shipments are further protected by a 3/4 inch thick wood container. Normal handtools are sufficient for unpacking.

CAUTION

> Exercise caution when removing the instrument from its shipping container to ensure that no damage is incurred at this time. Remember that the instrument contains a glass cathode ray tube (CRT).

2-5. HANDLING INSTRUCTIONS

2-6. If the shipping container is damaged, make a complete and detailed examination of the instrument. Remove the top and bottom sheet metal covers and examine the interior for damage and loose components or hardware. If obvious damage is observed, notify the carrier for insurance purposes and the AILTECH office in New York. Be sure to keep all the unpacking material until the carrier's representative has made an inspection. When no obvious damage is observed, continue with the installation procedure.

2-7. TOOLS AND MATERIALS REQUIRED FOR INSTALLATION

2-8. No special tools or materials are required. Rack mount accessories can be assembled with a cross recessed head screwdriver.

2-9. INPUT REQUIREMENTS

2-10. The AILTECH 757 Spectrum Analyzer can be operated from either a nominal 115 Vac lines main, or a nominal 230 Vac lines main.

WARNING

> Observe all the precautions listed in paragraph 1-27. In particular, determine that the line voltage selector card on the rear panel is set to its correct position. If it is necessary to change the card setting, proceed as follows:

1. Disconnect the power cord from the instrument.

2. Slide the plastic cover to the left to gain access to the full assembly. Using the fuse extractor that is part of the assembly, remove the fuse.

3. Remove the voltage select card that is located directly below the fuse holder, inside the assembly. Reinsert this card such that the proper line voltage is on the upper left side of the card. (See Figure 2-1.)

4. Insert the proper fuse and slide the plastic cover back over the fuse. For operation at 115 Vac, use a 3.0 amp slowblow fuse. For operation at 230 Vac, use a 1.5 amp slowblow fuse.

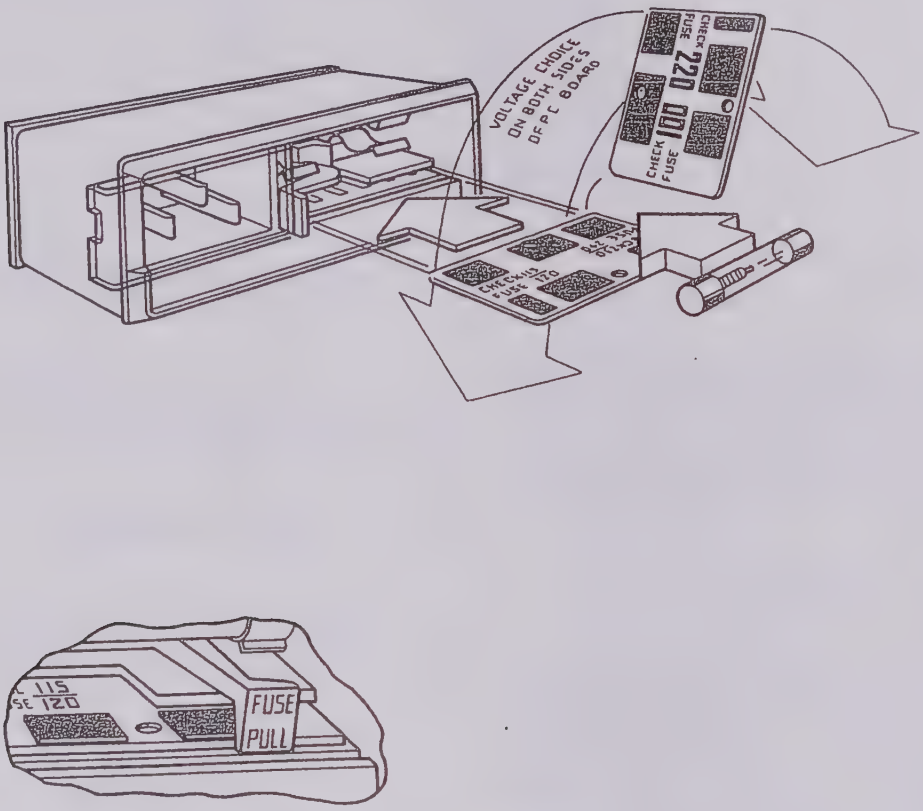


Figure 2-1. Fuse Assembly

WARNING

The power line cable is a three wire assembly to ensure that the instrument chassis is connected to the main ground. Under no conditions is this ground lead to be interrupted, or a two wire extension cable to be used.

CAUTION

Observe all the precautions given in paragraph 1-27 for the protection of the instrument.

2-11. INSTALLATION PROCEDURES

2-12. Instruments requiring Front Handles, Option 049 Rack Mount Adapter or Option 050 Slide Mount Adapter are provided with the options installed. When these options are to be field installed, proceed with the installation as shown in the appropriate illustration.

a. Front Handles. (See Figure 2-2).

b. Option 049 Rack Mounting Adapter and Option 050 Slide Mounting Adapter. (See Figures 2-3 and 2-4).

2-13. INITIAL TURN-ON AND PRELIMINARY TESTS

2-14. These tests are intended to be a rapid performance check of the instrument for acceptance by incoming inspection departments.

2-15. RECOMMENDED TEST EQUIPMENT

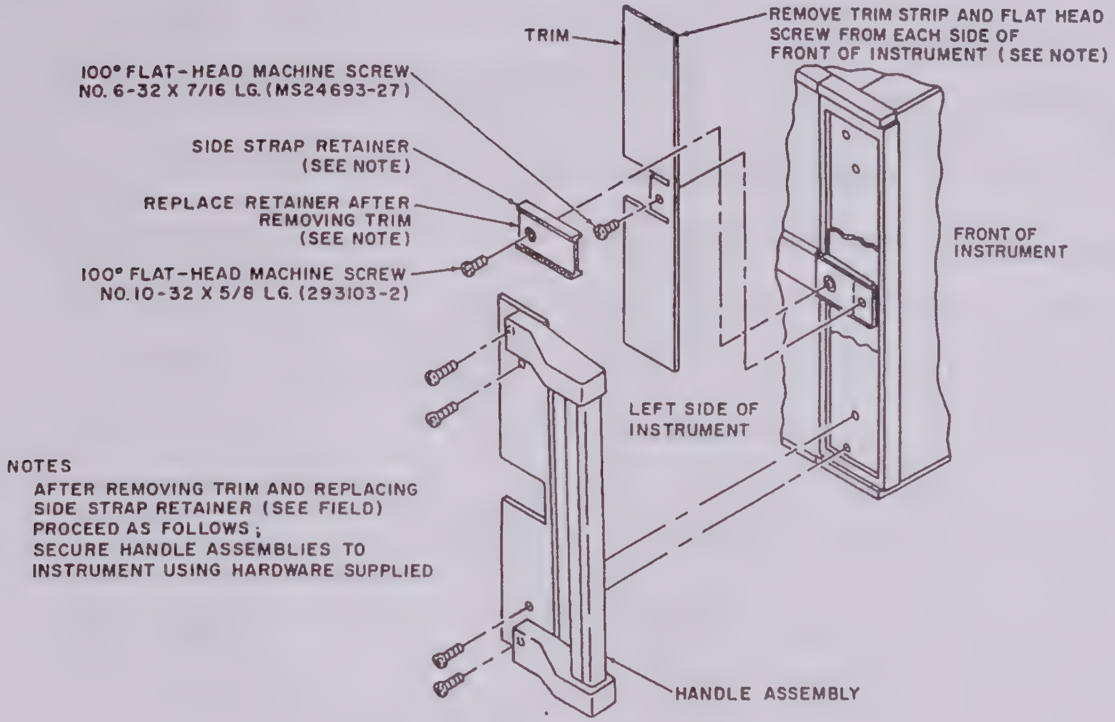
2-16. Table 2-1 lists the recommended test equipment for the preliminary test procedures.

2-17. PRELIMINARY TEST PROCEDURES

2-18. To perform the preliminary test procedures, proceed as follows:

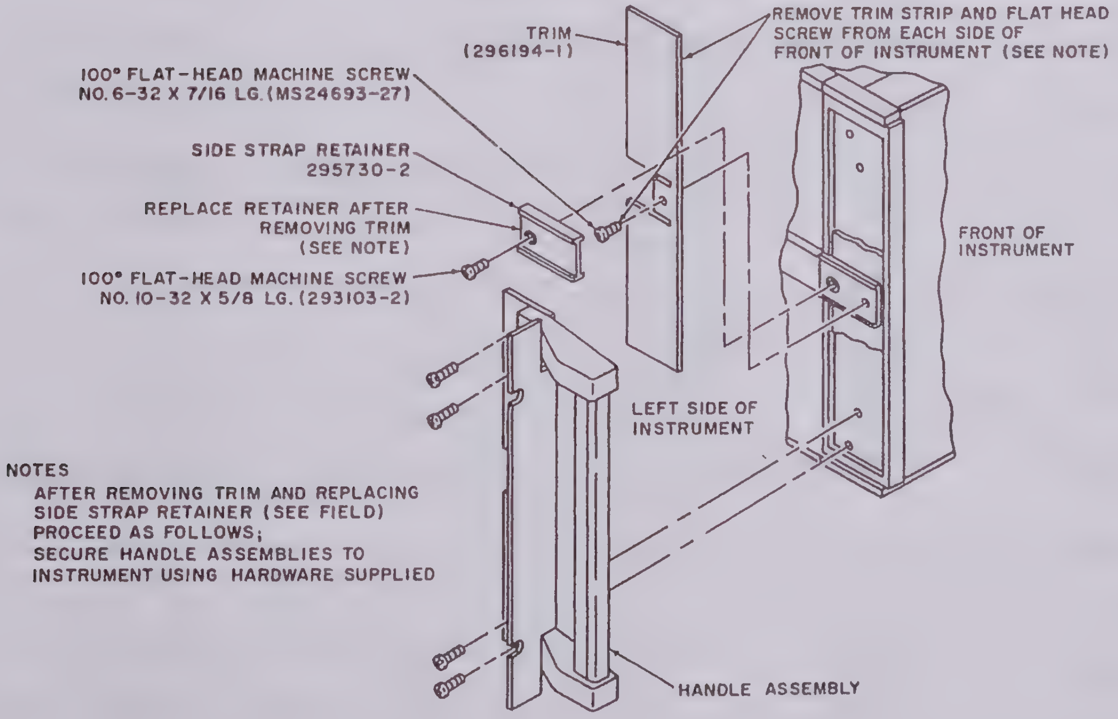
CAUTION

Observe all the precautionary instructions in paragraph 1-27 prior to energizing the instrument.


TRIM
REMOVE TRIM STRIP AND FLAT HEAD SCREW FROM EACH SIDE OF FRONT OF INSTRUMENT (SEE NOTE)
100° FLAT-HEAD MACHINE SCREW NO. 6-32 X 7/16 LG. (MS24693-27)
SIDE STRAP RETAINER (SEE NOTE)
REPLACE RETAINER AFTER REMOVING TRIM (SEE NOTE)
100° FLAT-HEAD MACHINE SCREW NO. 10-32 X 5/8 LG. (293103-2)
FRONT OF INSTRUMENT
LEFT SIDE OF INSTRUMENT
HANDLE ASSEMBLY

NOTES
AFTER REMOVING TRIM AND REPLACING SIDE STRAP RETAINER (SEE FIELD) PROCEED AS FOLLOWS;
SECURE HANDLE ASSEMBLIES TO INSTRUMENT USING HARDWARE SUPPLIED

Figure 2-2. Front Handles


TRIM (296194-1)
REMOVE TRIM STRIP AND FLAT HEAD SCREW FROM EACH SIDE OF FRONT OF INSTRUMENT (SEE NOTE)
100° FLAT-HEAD MACHINE SCREW NO. 6-32 X 7/16 LG. (MS24693-27)
SIDE STRAP RETAINER 295730-2
REPLACE RETAINER AFTER REMOVING TRIM (SEE NOTE)
100° FLAT-HEAD MACHINE SCREW NO. 10-32 X 5/8 LG. (293103-2)
FRONT OF INSTRUMENT
LEFT SIDE OF INSTRUMENT
HANDLE ASSEMBLY

NOTES
AFTER REMOVING TRIM AND REPLACING SIDE STRAP RETAINER (SEE FIELD) PROCEED AS FOLLOWS;
SECURE HANDLE ASSEMBLIES TO INSTRUMENT USING HARDWARE SUPPLIED

Figure 2-3. Rack Mount Option 049

Table 2-1. Recommended Test Equipment

Item	**Category**	**Minimum Use Specification**	**Recommended Equipment**
1	Comb Generator	Frequency Range 100 MHz to 16 GHz in 100 MHz intervals.	AILTECH 70790
2	Frequency Meter	Frequency Range 1 – 4 GHz	Hewlett Packard 536A
3	Frequency Meter	Frequency Range 4 – 12.4 GHz	Hewlett Packard 537A
4	Frequency Meter	Frequency Range 12.4 – 18 GHz	Hewlett Packard P532A
5	Signal Generator	Frequency Range 1 MHz – 500 MHz	AILTECH 460
6	Power Meter	Range: -30 to 0 dBm Accuracy: ±0.5 dBm	Boonton 42B and 41-4E

1. Turn Power on and allow 30 minutes for warm-up. Observe that the rear panel fan is operational, the CENTER FREQUENCY MHz readout is illuminated and the CRT display has a trace.

2. Verify that the left edge of the main trace on the CRT display is coincident with the left boundary graticule line.

3. Set the front panel controls as follows:

RF RANGE (GHz)	.001 – 2.0
RF ATTEN (dB)	20
IF ATTEN (dB)	10
SCAN WIDTH/DIV	200 MHz
SCAN WIDTH vernier	Maximum clockwise
IF BANDWIDTH (KHz)	AUTO
VAR VIDEO BW vernier	Maximum clockwise
VERT SCALE/DIV	10
EXPAND	REF
SCAN MODE	AUTO
BASELINE CONTRAST	Maximum counterclockwise
TUNING	Zero beat to left most graticule of CRT
FULL RANGE	OFF
SIGNAL CENTER	Centered
FREQ ADJ	Centered
SIGNAL IN	Enabled (LED on)
A	Enabled (LED on)
READOUT DISABLE	Disabled (LED off)
CALIBRATE	Disabled (LED off)
PRESELECTOR	IN
DOMAIN	FREQ
SCAN TIME/DIV	3
SCAN TIME Vernier	Maximum clockwise

4. Set the IF ATTEN (dB) control to 100 dB and the VAR VIDEO BW control counterclockwise. The CRT display trace should be a narrow line approximately 2 mm below the 100 dB mark.

5. Return the IF ATTEN (dB) control to 10 and the VAR VIDEO BW control to maximum clockwise. Connect the comb generator to the RF

INPUT connector. Observe that 20 comb lines appear on the CRT display.

6. Reset the SCAN WIDTH/DIV control to 100 MHz. Adjust the TUNING control until the 100 MHz comb line falls on the first graticule line. Observe that the following comb line also falls on a graticule line.

2-19. FREQUENCY ACCURACY TEST

1. Locate the 100 MHz line by counting 10 lines up from the zero beat. Adjust the TUNING control until the CENTER FREQUENCY (MHz) readout indicates 1000 and note that this comb line is at the center of the display. Set the SCAN WIDTH/DIV control to 10 MHz and reposition the signal to the exact center of the display using the TUNING control. Observe that the CENTER FREQUENCY (MHz) readout is 1000 ± 6 MHz.

NOTE

> Because of the hysteresis of the Yig components, it may be necessary to rotate the SCAN WIDTH/DIV control fully clockwise then back to 10 MHz before centering the signal.

2. Turn the RF RANGE (GHz) control to the 1.8 – 4.0 position. Verify that the signal appearing on CRT is the 3000 MHz comb line with the appropriate frequency meter. Adjust the TUNING control until the signal is exactly centered and observe that the CENTER FREQUENCY (MHz) readout is 3000 ± 6 MHz.

3. Turn the RF RANGE (GHz) control to the 3.3 – 8.3 position and the RF ATTEN (dB) control to 0. Verify that the signal appearing on CRT is the 5800 MHz comb line with the appropriate frequency meter. Adjust the TUNING control until the signal is exactly centered and observe that the CENTER FREQUENCY (MHz) readout is 5800 ± 12 MHz.

NOTE

> As the input frequencies increase, the power of the comb signals decrease. Therefore, a slight adjustment of the SIGNAL CENTER control may be required to peak the instrument's response.

4. Set the RF RANGE (GHz) control to the 5.4 – 12.4 position and repeat step 3. Signal frequency should be 8900 MHz ± 18 MHz.

5. Set the RF RANGE (GHz) control to the 10 – 22 position and repeat step 3. Signal frequency should be 16000 ± 32 MHz.

2-20. PHASE LOCK TEST

1. Return the RF RANGE (GHz) control to the 1.8 to 4.0 GHz position. Adjust the TUNING control, if necessary, until the 3000 MHz line is centered. Set the SCAN WIDTH/DIV control to the 300 KHz position. The analyzer is now in phase lock. Rotating the TUNING control should move the signal on the display, but not change the digital readout. Set the SCAN WIDTH/DIV control to the 1 KHz position. Signal should remain on the display. Only slight adjustments to the TUNING control may be required to keep the signal centered.

2. Return the SCAN WIDTH/DIV control to 300 KHz. Depress the SIGNAL CENTER control and rotate clockwise and counterclockwise. Note that the signal will jump to another lock, position in approximately 1 MHz displacement.

2-21. IF BANDWIDTH TEST

1. Observe on the display and LED indicators that the IF bandwidths are automatically changed as the SCAN WIDTH/DIV control is exercised with the IF BANDWIDTH control set in AUTO position.

SCAN WIDTH	SCAN TIME	BANDWIDTH
10 MHz/div and higher	3 ms/div	1 MHz
3, 1 MHz and 300 KHz	3 ms/div	100 KHz
100 and 30 KHz	3 ms/div	10 KHz
10 KHz and lower	3 ms/div	1 KHz

2. Override the IF BANDWIDTH AUTO position to verify the manual selection of the filters.

2-22. VERTICAL SCALE TEST

1. Return IF BANDWIDTH (KHz) control to AUTO and SCAN WIDTH/DIV control to 10 MHz. Bring signal level to 50 dB line using IF ATTEN (dB) control. Rotate VERT SCALE/DIV control to 5 LOG and EXPAND control to NOISE. Note that signal reaches top of display ± 1 division.

2. Add another 30 dB of IF attenuation and set VERT SCALE/DIV control to 2 LOG. Signal should reach the top of the display ± 1 division.

3. Set VERT SCALE/DIV control to LIN. Signal should reach the top of the display ± 1 division.

4. Return VERT SCALE/DIV control to 10 LOG and IF ATTEN (dB) control to 10.

2-23. DISPLAY CONTROL FUNCTION TEST

1. Depress HOLD pushbutton and observe that the display becomes fixed (does not update).

2. Depress B VIEW A pushbutton and slightly rotate TUNING control. Observe that two signals appear on display; one remains fixed, while the other is moveable with tuning control.

3. Depress SIGNAL IN, A, SAVE, RECALL pushbuttons in this order. Observe that the display once again becomes fixed.

4. Depress SIG IN-MEMORY pushbutton and observe a horizontal line at the 50 dB level.

5. Depress READOUT DISABLE pushbutton and note that the control settings are blanked on the display.

6. Depress SIGNAL IN, A, and BYPASS pushbuttons. Observe that the display is now operating in a normal persistence manner, without digital storage. This may be more readily seen if the SCAN TIME/DIV control is set to the 100 m SEC position and an obvious flicker is apparent.

7. With the SCAN TIME/DIV control set to 3 m SEC, rotate the BASELINE control clockwise until the noise baseband disappears. Turn the concentric CONTRAST control clockwise and note that the clipped area can be restored with controlled intensity.

2-24. AMPLITUDE ACCURACY TEST

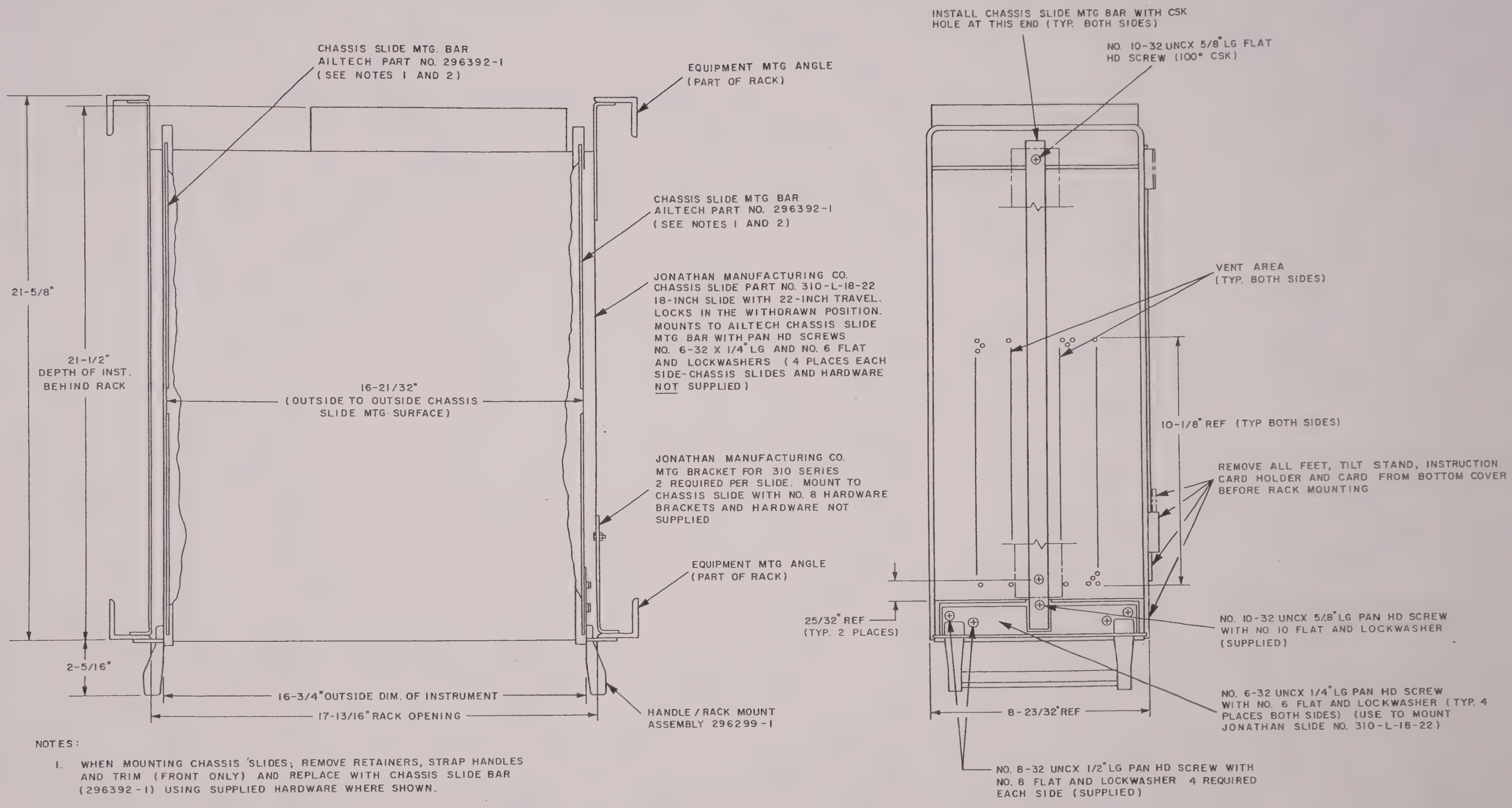
1. Return all controls to the positions designated in paragraph 2-18, step 3. Set the signal generator to obtain a -20 dBm signal at 100 MHz. Verify absolute power level using power meter. Set RF ATTEN (dB) and IF ATTEN (dB) controls to 0. Peak the signal with the SIGNAL CENTER control and observe that it is at the 0 dB REF LEVEL graticule line ±1 dB. The CRT display REF LEVEL readout should indicate -20 dBm ± 1 dB. If not adjust AMP ADJ control accordingly.

NOTE

If the instrument has an 001 Increased Sensitivity Option, set the RF ATTEN (dB) control to 20 and perform the above test.

Table 2-2. Preliminary Test Procedure Data Sheet

Function Tested	Nominal Value	Performance Limits	Passed
Frequency Accuracy Test			
Band 1	1000 MHz	944 – 1006 MHz	☐
Band 2	3000 MHz	2994 – 3006 MHz	☐
Band 3	5800 MHz	5788 – 5812 MHz	☐
Band 4	8900 MHz	8882 – 8918 MHz	☐
Band 5	16000 MHz	15968 – 16032 MHz	☐
Phase Lock Test	–	–	☐
IF Bandwidth Test			
>10 MHz/Div	BW = 1 MHz	–	☐
3, 1 MHz/Div, 300 KHz/Div	BW = 100 KHz	–	☐
100, 30 KHz/Div	BW = 10 KHz	–	☐
10, 1 KHz/Div	BW = 1 KHz	–	☐
Vertical Scale Test			
5 Log Position	Full Scale	±1 division	☐
2 Log Position	Full Scale	±1 division	☐
LIN Position	9 divisions	±1 division	☐
Display Control Function Test			
HOLD			☐
B VIEW A			☐
SAVE, RECALL			☐
SIG-IN MEMORY			☐
READ OUT DISABLE			☐
BYPASS			☐
BASELINE			☐
CONTRAST			☐
Amplitude Accuracy Test			
Full Scale with -20 dBm input	-20 dBm	±1 dB	☐


CHASSIS SLIDE MTG. BAR
AILTECH PART NO. 296392-1
(SEE NOTES 1 AND 2)
EQUIPMENT MTG ANGLE
(PART OF RACK)
CHASSIS SLIDE MTG BAR
AILTECH PART NO. 296392-1
(SEE NOTES 1 AND 2)
JONATHAN MANUFACTURING CO.
CHASSIS SLIDE PART NO. 310-L-18-22
18-INCH SLIDE WITH 22-INCH TRAVEL.
LOCKS IN THE WITHDRAWN POSITION.
MOUNTS TO AILTECH CHASSIS SLIDE
MTG BAR WITH PAN HD SCREWS
NO. 6-32 X 1/4" LG AND NO. 6 FLAT
AND LOCKWASHERS (4 PLACES EACH
SIDE-CHASSIS SLIDES AND HARDWARE
NOT SUPPLIED)
21-5/8"
21-1/2"
DEPTH OF INST.
BEHIND RACK
16-21/32"
(OUTSIDE TO OUTSIDE CHASSIS
SLIDE MTG SURFACE)
JONATHAN MANUFACTURING CO.
MTG BRACKET FOR 310 SERIES
2 REQUIRED PER SLIDE. MOUNT TO
CHASSIS SLIDE WITH NO. 8 HARDWARE
BRACKETS AND HARDWARE NOT
SUPPLIED
EQUIPMENT MTG ANGLE
(PART OF RACK)
2-5/16"
16-3/4" OUTSIDE DIM. OF INSTRUMENT
17-13/16" RACK OPENING
HANDLE / RACK MOUNT
ASSEMBLY 296299-1
INSTALL CHASSIS SLIDE MTG BAR WITH CSK
HOLE AT THIS END (TYP. BOTH SIDES)
NO. 10-32 UNCX 5/8" LG FLAT
HD SCREW (100° CSK)
VENT AREA
(TYP. BOTH SIDES)
10-1/8" REF (TYP BOTH SIDES)
REMOVE ALL FEET, TILT STAND, INSTRUCTION
CARD HOLDER AND CARD FROM BOTTOM COVER
BEFORE RACK MOUNTING
25/32" REF
(TYP. 2 PLACES)
NO. 10-32 UNCX 5/8" LG PAN HD SCREW
WITH NO. 10 FLAT AND LOCKWASHER
(SUPPLIED)
NO. 6-32 UNCX 1/4" LG PAN HD SCREW
WITH NO. 6 FLAT AND LOCKWASHER (TYP. 4
PLACES BOTH SIDES) (USE TO MOUNT
JONATHAN SLIDE NO. 310-L-18-22)
8-23/32" REF
NO. 8-32 UNCX 1/2" LG PAN HD SCREW WITH
NO. 8 FLAT AND LOCKWASHER 4 REQUIRED
EACH SIDE (SUPPLIED)

NOTES:

1. WHEN MOUNTING CHASSIS SLIDES; REMOVE RETAINERS, STRAP HANDLES AND TRIM (FRONT ONLY) AND REPLACE WITH CHASSIS SLIDE BAR (296392-1) USING SUPPLIED HARDWARE WHERE SHOWN.
2. CHASSIS SLIDE MTG BARS MAY BE MODIFIED BY THE CUSTOMER TO ADAPT SLIDES OTHER THEN THOSE ILLUSTRATED.

Figure 2-4. Slide Mount Option 050

SECTION 3

OPERATION

3-1. INTRODUCTION

3-2. This section presents the basic operating information and procedures necessary for the user to efficiently operate the AILTECH 757 Spectrum Analyzer. It identifies and locates all the controls, indicators, and connectors which the operator is required to use to accomplish this task. Preliminary control settings are listed as a basic starting point for the less experienced user. A brief discussion on the following types of measurements is also included to acquaint the user with the capability of the instrument.

a. Frequency Measurement (paragraph 3-9)

b. Amplitude Measurements (paragraph 3-11)

c. Time domain (zero scan) Measurements (paragraph 3-15)

d. Bandwidth Effects (paragraph 3-18)

e. Narrowband Spectrum Analysis (paragraph 3-20)

f. Broadband Spectrum Analysis (paragraph 3-21)

3-3. CONTROLS, INDICATORS AND CONNECTORS

3-4. The controls, indicators and connector on the front panel are illustrated in Figure 3-1. Table 3-1 lists the panel nomenclature and function of each control, indicator or connector. The index number is keyed to the index number shown in Figure 3-1. Figure 3-2 illustrates the rear panel connectors. Table 3-2 lists the panel nomenclature and function of each rear panel connector.

3-5. OPERATING PROCEDURES

3-6. The following paragraphs provide operating instructions for the AILTECH 757 Spectrum Analyzer. The procedures consist of preliminary control settings, frequency measurements, amplitude measurements, time domain measurements, bandwidth effects, narrowband and broadband spectrum analysis.

3-7. PRELIMINARY CONTROL SETTINGS FOR SIGNALS OF KNOWN FREQUENCY. Table 3-3 lists the suggested initial control settings to ensure that the desired signal will appear on screen. These settings assume the operator knows the frequency of the input signal.

3-8. PRELIMINARY CONTROL SETTINGS FOR SIGNALS OF UNKNOWN FREQUENCY. Use the same settings as Table 3-3 with the following changes:

1. Turn the FULL RANGE ON/OFF control clockwise to the ON position.

2. Set RF ATTEN (dB) to $\boxed{10}$ position.

3. Rotate RF RANGE (GHz) control until frequency of interest appears on display.

4. Adjust the TUNING control until the marker on the baseline noise is center directly below the desired signal.

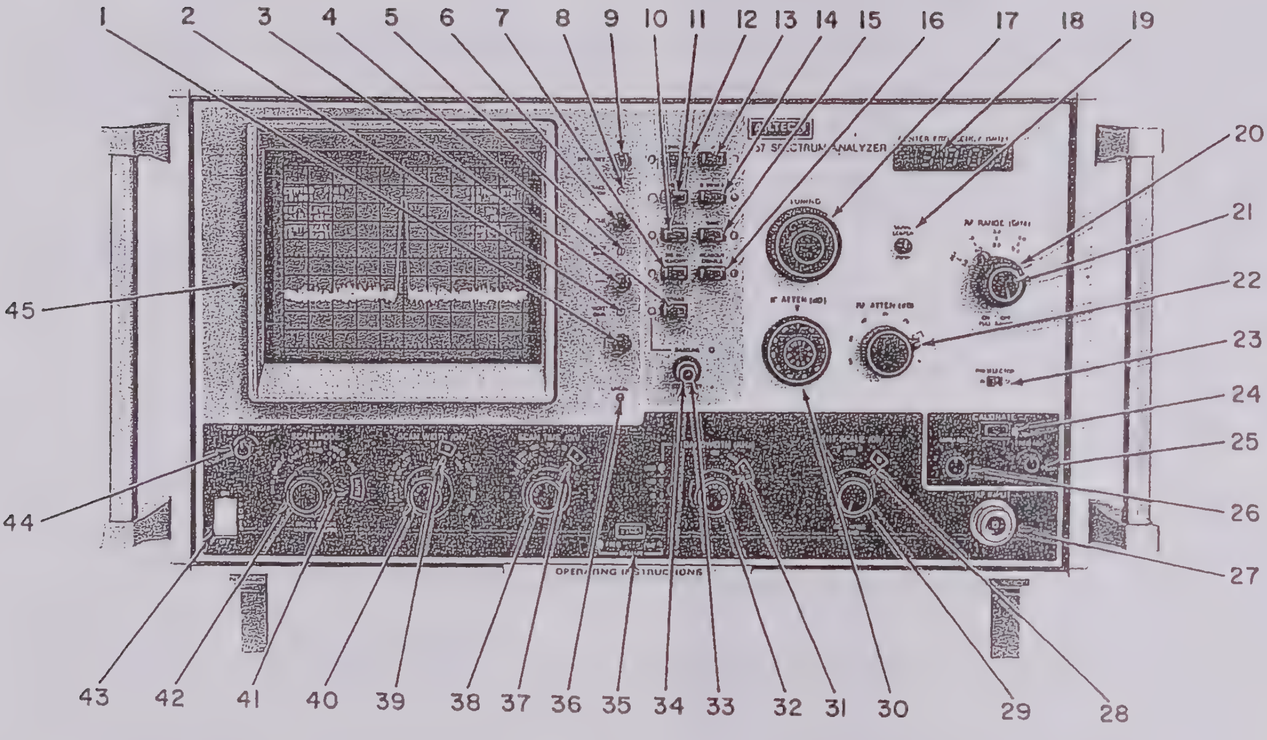
5. Turn the FULL RANGE ON/OFF control counterclockwise to OFF position. The desired signal will appear near the center of the display.

3-9. FREQUENCY MEASUREMENTS. Observing the CENTER FREQUENCY (MHz) readout, the frequency of the input signal can be determined to an accuracy of ±2% as follows:

1. Adjust the TUNING control until the signal of interest appears at the center of the display.

2. Set the SCAN WIDTH/DIV control to 1 MHz.

3. Make any fine adjustments with the TUNING control until signal is exactly centered.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757 SPECTRUM ANALYZER
OPERATING INSTRUCTIONS

Figure 3-1. 757 Spectrum Analyzer Front Panel Controls, Indicators and Connector

Table 3-1. 757 Spectrum Analyzer Front Panel Controls, Indicators, and Connector

Figure 3-1 Index No.	Control and Indicator	Function
1	↕ Control	Adjusts vertical position of trace. (Refer to paragraph 2-18 steps 4 and 5.)
2	VERT GAIN Control	Adjusts vertical length of trace for full scale deflection, or as required by application.
3	↔ Control	Adjusts horizontal position of trace. (Refer to paragraph 2-18 step 6.)
4	BYPASS Pushbutton	Eliminates digitizing of the video signal and displays it in analog form.
5	HORZ GAIN Control	Adjusts horizontal length of trace for full scale deflection, or as required by application.
6	FOCUS Control	Adjusts clarity of trace by controlling spot size.
7	SIG IN-MEMORY Pushbutton	Subtracts the contents of the A memory from Channel A or the B memory from Channel B.
8	TRACE ALIGN Control	Rotates trace for horizontal alignment.
9	INTENSITY Control	Adjusts the brightness of the display from completely extinguished (full counterclockwise position) to acceptable viewing brightness as control is turned clockwise.
10	RECALL Pushbutton	Displays the contents of A memory when A is selected or the contents of B memory when B VIEW A is selected. A channel remains active in latter mode.
11	HOLD Pushbutton	Holds data from channel A when A is activated or from channel B when B VIEW A is activated.
12	SIGNAL IN Pushbutton	Inputs active signal.
13	A Pushbutton	Displays input signal from channel A.
14	B VIEW A Pushbutton	Displays input signal from channel B and data from channel A. The two traces will be the same unless channel A data is fixed by HOLD or SAVE.
15	SAVE Pushbutton	Saves contents of channel A in a separate memory register when A is activated or contents of channel B when B VIEW A is activated.
16	READOUT DISABLE Pushbutton	Removes the control setting readout from the CRT display.
17	TUNING Control	a. Sets the center frequency of the interval being scanned. The outer knob is for coarse tuning and the inner knob is mechanically reduced by a five to one ratio for finer tuning adjustments. b. Sets the marker frequency in the full range scan mode.

Table 3-1. 757 Spectrum Analyzer Front Panel Controls, Indicators, and Connector (Continued)

Figure 3-1 Index No.	Control and Indicator	Function
18	CENTER FREQUENCY (MHz) Readout Indicator	a. This five digit LED display indicates the frequency of the signal at the center of the display. b. Indicates marker frequency in FULL RANGE mode. c. Indicates tuned frequency in TIME DOMAIN (zero span) mode.
19	SIGNAL CENTER/ PUSH Control	a. Centers the signal in the bandpass of the preselector assuring a maximum amplitude display under all operating conditions. This control manually compensates for any tracking misalignment between the local oscillator and the preselector. It is required more often at high frequencies where harmonic mixing is used. b. At dispersions of 300 KHz and lower (in phase lock), this control, when PUSHed, will transfer the lock to another frequency in 1XN MHz spacings (N is the LO harmonic mixing number. It also allows for the recapture of a broken lock without readjusting any of the other controls.
20	RF RANGE (GHz) Control	Selects frequency limits of the spectrum being scanned as follows: .001 to 2.0 GHz 1.8 to 4.0 GHz 3.3 to 8.3 GHz 5.4 to 12.4 GHz 10.0 to 22 GHz
21	FULL RANGE ON/OFF Control	In the ON position the analyzer scans the entire spectrum indicated by the RF RANGE (GHz) control. In the OFF position the scanning interval will be that defined by the SCAN WIDTH/DIV control.
22	RF ATTEN (dB) Control	Provides 0 to 60 dB of attenuation in 10 dB steps to the input signal presaturation and possible damage to the input mixer from strong signals.
23	PRESELECTOR IN/ OUT Control	Allows the preselector to be electronically removed from the analyzer increasing the sensitivity by approximately 10 dB. This is most useful in 1.8 to 22 GHz range.
24	CALIBRATE Pushbutton	Inputs the internal harmonic generator that supplies 100 MHz spaced signals from 100 MHz to 22 GHz.
25	FREQ ADJ Control	Adjusts CENTER FREQUENCY (MHz) readout for accurate calibration up to a maximum of ±20 MHz.
26	AMPL ADJ Control	Adjusts the REF LEVEL (0 dB graticule line) in 1 dB steps for accurate amplitude calibration.

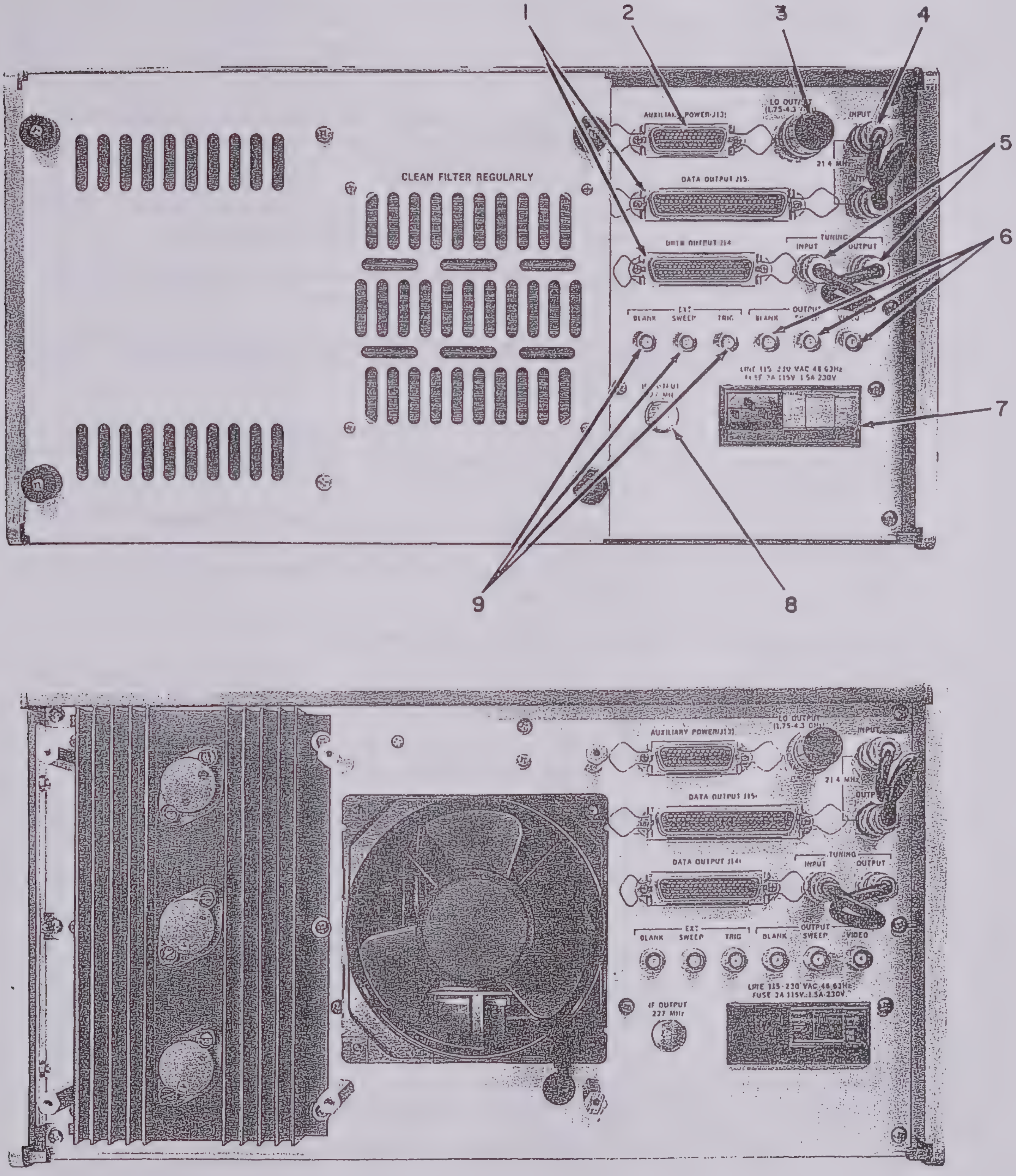
Table 3-1. 757 Spectrum Analyzer Front Panel Controls, Indicators, and Connector (Continued)

Figure 3-1 Index No.	Control and Indicator	Function
27	RF INPUT Connector	Precision type N female connector: input for signals in the range from 0 to 22 GHz.
28	VERT SCALE/DIV Control	Sets the logarithmic amplitude of the display (LOG) to be 2, 5 or $\boxed{10}$ dB per division, or converts to linear amplitude display (LIN).
29	EXPAND REF/NOISE Control	Permits signal expansion either upward from the noise for very weak signals, or downward from the REF LEVEL for strong signals and to maintain amplitude calibration.
30	IF ATTEN (dB) Control	Step attenuator to adjust the display amplitude. Other knob provides 100 dB attenuation in 10 dB steps; inner knob provides 10 dB in 1 dB steps.
31	IF BANDWIDTH (KHz) Control	a. Manually selects an IF bandwidth of 1, 10, 100 or 1000 KHz. b. in $\boxed{\text{AUTO}}$ the analyzer selects the proper IF filter for the combined SCAN WIDTH/DIV and SCAN TIME/DIV control settings. An LED indicator designates which filter is selected.
32	VAR VIDEO BW Control	In the off position (full clockwise) a video filter of approximately equal bandwidth to the IF filter will be automatically selected. When rotated counterclockwise a continuous amount of smoothing will be obtained.
33	BASELINE Control	Adjusts baseline clipping level. Operational only in BYPASS mode.
34	CONTRAST Control	Adjusts intensity of the clipped portion of the display. Operational only in BYPASS mode.
35	DOMAIN/FREQ/ TIME Control	Selects either frequency domain or time domain (zero span).
36	UNCAL Indicator	Warning light denoting uncalibrated display due to: a. Either the SCAN TIME/DIV or SCAN WIDTH/DIV vernier in the uncalibrated position. b. FREQ DOMAIN mode with SCAN TIME/DIV between 1 and .01 msec. c. Incorrect IF bandwidth for SCAN TIME/DIV and/or SCAN WIDTH/DIV selected. d. VAR VIDEO BW control in the uncalibrated position.
37	SCAN TIME/DIV Control	Selects calibrated frequency sweeps from 10 seconds to .01 msec per division.

Table 3-1. 757 Spectrum Analyzer Front Panel Controls, Indicators, and Connector (Continued)

Figure 3-1 Index No.	Control and Indicator	Function
38	SCAN TIME CAL Vernier	Concentric control for interpolation between values.
39	SCAN WIDTH/DIV Control	Selects calibrated frequency scan widths from 1 kHz to 700 MHz per division.
40	SCAN WIDTH CAL Vernier	Concentric control for interpolation between calibrated values. Allows reduction of scan width to zero.
41	SCAN MODE Control	Selects trigger mode for internal scan or sets analyzer to accept an external control signal as follows: $\boxed{\text{AUTO}}$ Recurring scan, internally generated LINE Scan triggered by the ac line frequency VIDEO Scan triggered by the detected RF input signal whose level is controlled by VIDEO TRIG control EXT TRIG Scan triggered by an external +2 volt minimum signal into rear panel connector. EXT SWEEP Requires external 0 to +6 volts signal for 10 divisions left-to-right horizontal deflection into rear panel connector J2. SINGLE Single scan initiated by depressing concentric SINGLE (PUSH) pushbutton. MAN Allows manual frequency scanning by use of concentric MANUAL (TURN) vernier.
42	SINGLE (PUSH)/MANUAL (TURN) Control	Concentric with SCAN MODE control, PUSH for SINGLE scan, TURN for MANUAL scan.
43	POWER ON/OFF Control	ON/OFF control for primary ac power.
44	VIDEO TRIG Control	Adjusts triggering point of detected RF input signal when SCAN MODE control is in VIDEO position.
45	CRT Display	Displays traces of waveforms and alphanumeric readout of functions.

NOTE: $\boxed{}$ MARK indicates normal operation position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CLEAN FILTER REGULARLY
AUXILIARY POWER J13
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INPUT
21.4 MHz
OUTPUT
DATA OUTPUT J15
DATA OUTPUT J14
TUNING
INPUT
OUTPUT
EXT
BLANK
SWEEP
TRIG
OUTPUT
BLANK
SWEEP
VIDEO
LINE 115-230 VAC 48-63Hz
FUSE 3A 115V 1.5A 230V
IF OUTPUT
227 MHz

Figure 3-2. 757 Spectrum Analyzer Rear Panel Connectors

Table 3-2. 757 Spectrum Analyzer Rear Panel Connectors

Figure 3-2 Index No.	Connectors	Function
1	DATA OUTPUT 1 and 2 Connectors J14 and J15	Provide the waveform information and the instrument's control positions in a digital parallel binary format. Additional data lines indicate when the information is valid and in which channel and memory register it is stored.
2	AUXILIARY POWER Connector J13	a. Provides the dc voltages and control signals necessary to operate the Type 70726 and 70727 Tracking Generators. b. Provides parallel outputs for the Video, Sweep and Blank Signals required to operate an external display or recorder.
3	LO OUTPUT (1.75 – 4.5 GHz) Connector J12	A type N connector that makes the Yig local oscillator signal available for external use. Typical output between 1.75 and 4.5 GHz at a power level of approximately 0 dBm.
4	21.4 MHz INPUT/ OUTPUT Connectors J10 and J11	Provides access to the 21.4 MHz IF at a point between the IF attenuator and the LOG detector. Jumper cable must be connected for instrument to function properly.
5	TUNING INPUT/ OUTPUT Connectors J8 and J9	Provides access to the tuning circuits remotely. With jumper in place, front panel tuning control is operational. With jumper removed a dc voltage between ±6 Vdc applied to the TUNING INPUT connector will tune the analyzer throughout any RF range.
6	OUTPUT Connectors BLANK/SWEEP/ VIDEO J4, J5 and J6	BLANK TTL output. High during retrace. SWEEP 0 – 6 Vdc level proportional to horizontal sweep position. 0 volts corresponds to left edge of display. VIDEO 0 – 1.5 Vdc level proportional to vertical deflection. 0 volts corresponds to bottom of display. NOTE: These outputs correspond to the RF sweep. They are similar to display sweeps in BYPASS mode only.
7	Voltage Selecting and Fused Connector	Internationally approved power line connector, fuse holder and voltage selector card. Also contains an RFI filter for equipment protection.
8	IF OUTPUT 227 MHz Connector J7	Instruments with 002 Option include a Type BNC connector at this point to output the 227 MHz IF.
9	EXT Input Connectors BLANK/SWEEP/TRIG J1, J2 and J3	BLANK TTL high blanks display waveform. SWEEP Accepts a 0 – 6 volt signal for full scale deflection. TRIG Positive going TTL transition initiates sweep. NOTE: These inputs correspond to the RF sweeps. They will control the display horizontal blanking triggering only in BYPASS mode.

Table 3-3. Preliminary Control Settings For Signals of Known Frequency

Figure 3-1 Index No.	Control Nomenclature	Setting
43	POWER	Set to the ON position.
20	RF RANGE (GHz)	Lowest range that contains frequency signal to be analyzed.
21	FULL RANGE ON/OFF	OFF
17	TUNING	Adjust until CENTER FREQUENCY (MHz) readout (18) indicates desired frequency.
22	RF ATTEN (dB)	Set this control to 60, maximum counterclockwise. Rotate clockwise as required to adjust signal amplitude to convenient level.
30	IF ATTEN (dB)	10 dB
31	IF BANDWIDTH (KHz)	AUTO
32	VAR VIDEO BW	Maximum clockwise
28	VERT SCALE/DIV	10
37	SCAN TIME/DIV	3
39	SCAN WIDTH/DIV	10
19	SIGNAL CENTER	Centered
41	SCAN MODE	AUTO
35	DOMAIN/FREQ/TIME	FREQ
12	SIGNAL IN	Enabled
13	A	Enabled
23	PRESELECTOR IN/OUT	IN
24	CALIBRATE	Disabled

4. Read its frequency either on the CRT or on the CENTER FREQUENCY (MHz) readout.

NOTE

Reducing the SCAN WIDTH/DIV below 1 MHz locks the frequency readout and does not improve accuracy.

3-10. IMPROVING ACCURACY OF FREQUENCY MEASUREMENT. Accuracy can be improved to ±1 MHz by using the internal CALIBRATE feature of the 757 as follows:

1. Turn on the internal calibrate signal generator by depressing the CALIBRATE control.

2. Adjust the TUNING control until the harmonic signal nearest in frequency to the desired signal is centered on the display.

3. Turn the FREQ ADJ control until the CENTER FREQUENCY (MHz) readout indicates the closest exact multiple of 100 MHz. (e.g., the last two digits of CENTER FREQUENCY (MHz) readout should be zero.)

4. Turn off the internal calibrate signal generator and readjust TUNING control to center input signal. Read corrected frequency. Accuracies approaching ±1 MHz can be attained by following this procedure.

5. Table 3-4 shows the application of the procedure described above.

Table 3-4. Accuracy Results

Signal	CENTER FREQUENCY (MHz) Readout
Input prior to FREQ ADJ	6132
CALIBRATE prior to FREQ ADJ	6110
CALIBRATE after FREQ ADJ	6100
Input after FREQ ADJ	6122

3-11. AMPLITUDE MEASUREMENTS. The 757 Spectrum Analyzer is capable of making absolute power measurements because the top graticule line, designated REF LEVEL, is factory calibrated and referenced to the RF INPUT. A signal level of approximately -20 dBm will read the REF LEVEL line with the IF ATTEN (dB) and RF ATTEN (dB) controls set to 0. If the 001 High Sensitivity Option is included the RF ATTEN (dB) control is set to 20 in the .001 to 2.0 GHz frequency range. As attenuation is added, the absolute value of the REF LEVEL will change accordingly. Therefore, the power level of any signal can quickly be determined by:

Noting the number of divisions the top of the signal is below the REF LEVEL, converting this number to dB using the VERT SCALE/DIV control setting multiplier and subtracting the result from the REF LEVEL value.

Example:

1. REF LEVEL -33 dBm (due to arbitrary setting of attenuators)

2. Top signal 2.4 divisions below top line

3. VERT SCALE/DIV $\boxed{10}$ LOG

4. Absolute signal power (-33 dBm – 2.4 X 10 dBm = -57 dBm.

3-12. For signals stronger than -20 dBm, the attenuators may be adjusted to position the signal at the top graticule line. Its absolute power can then be read directly on the CRT.

Example:

1. Signal saturates at the top of the display with 0 attenuation.

2. After setting the RF ATTEN (dB) control to $\boxed{10}$ and the IF ATTEN (dB) control to 3, signal just reaches REF LEVEL without saturation.

3. Absolute power is read directly on CRT as REF LEVEL -7 dBm.

NOTE

For best accuracy always peak the signal using the SIGNAL CENTER control before making an amplitude measurement.

3-13. The accuracy of these measurements can be further improved by using the internal CALIBRATE feature as follows:

1. Turn on the internal calibrate signal generator by depressing CALIBRATE. Adjust the TUNING control until the harmonic signal at the center of the appropriate RF RANGE (GHz) is positioned approximately at the center of the CRT.

2. Peak the signal using the SIGNAL CENTER control.

3. Refer to the calibration chart on the instruments operating instruction card for the absolute power level of this signal. Verify that the value of the REF LEVEL is accurate.

4. Correct any errors by adjusting the AMPL ADJ control.

NOTE

Errors of a few dB are possible due to the frequency response characteristics of the analyzer.

3-14. Relative amplitude measurements are most accurately made by the IF substitution method.

1. Position the weaker signal exactly on a convenient graticule line using the IF ATTEN (dB) control. Note the setting of the attenuator.

2. Increase the IF ATTEN (dB) control until the stronger signal is at the same graticule line as above.

3. The difference in attenuator settings is the relative amplitude difference of the signals. For best resolution, use the 5 dB, 2 dB or LIN position of the VERT SCALE/DIV control.

3-15. TIME DOMAIN (ZERO SCAN) MEASUREMENTS. The AILTECH 757 Spectrum Analyzer can be fixed tuned at any frequency to display the detected power level as a function of time. This mode of operation is very useful for amplitude modulation measurements and the determination of pulse repetition frequencies. In this mode, a continuous wave signal appears on the CRT as a horizontal line. If the continuous wave signal is sinusoidally modulated, the horizontal lines become a sinusoid.

NOTE

The VERT SCALE/DIV control must be in the LIN position or the sinusoid will appear distorted by the log detector.

The frequency response of the detected waveform is limited by the IF and video bandwidths of the instrument.

3-16. Time Domain measurements are made as follows:

1. Set the controls in accordance with Table 3-3.

2. Set the DOMAIN control to the TIME position.

3. For many amplitude modulation measurements it will be desirable to select a more sensitive scale with the VERT SCALE/DIV control, often the LIN position is used.

4. The display can be more easily synchronized by selecting the SCAN MODE control to VIDEO for an internal trigger, or by using the EXT TRIG. The VIDEO TRIG control has a threshold adjustment for optimum performance.

5. The SCAN TIME/DIV control may be set to any position to present the most favorable display.

3-17. FM signals can be demodulated by the slope detection method. Adjust the TUNING control until the signal is on the slope of an appropriate IF filter, about half way between the peak level and the noise. The detected signal can be monitored at VIDEO output connector J6 on the rear panel.

NOTE

Time domain operation can also be obtained by setting the SCAN WIDTH/DIV CAL vernier to a fully counterclockwise position.

3-18. BANDWIDTH EFFECTS. The resolution and sensitivity of a spectrum analyzer are functions of its IF bandwidth; the narrower the bandwidth, the better the resolution and sensitivity. However, narrow bandwidths require narrow scan widths, slow scan times, or both; otherwise, the IF filters may not have sufficient time to fully respond to the signal, resulting in an apparent loss in signal level. If the IF bandwidth is wider than the scan width, there will be a loss of resolution. For any particular combination of SCAN WIDTH/DIV and SCAN TIME/DIV control settings, there is an optimum IF bandwidth providing the best resolution without loss of signal level.

3-19. The IF BANDWIDTH (KHz) control provides four bandwidths and an AUTO position. When the control is in the latter position, the analyzer automatically selects the bandwidth closest to the optimum value. This feature relieves the operator of the necessity of continually readjusting the IF BANDWIDTH as the SCAN WIDTH/DIV and SCAN TIME/DIV controls are changed. The bandwidths selected by the analyzer in the AUTO bandwidth mode are shown in Figure 3-3 for reference.

3-20. NARROWBAND SPECTRUM ANALYSIS. The AILTECH 757 Spectrum Analyzer provides calibrated scan widths as small as 1 KHz per division, thus permitting finely detailed analysis of signal spectra. In order to fully utilize these narrow scan widths, the internal Yig local oscillator of the analyzer is frequently stabilized. The stabilization system (phase-lock loop) activates automatically when the SCAN WIDTH/DIV control is switched from a MHz to a KHz position. To operate the AILTECH 757 Spectrum Analyzer at KHz scan widths, proceed as follows:

1. Set the controls per Table 3-3.

2. Adjust the TUNING control until the signal of interest is centered.

3. Reduce the SCAN WIDTH/DIV control one step at a time to the 1 MHz/div position. Adjust the TUNING control if necessary to keep the signal centered.

4. Reduce the SCAN WIDTH/DIV control to 300 KHz/div.

5. The analyzer first LO should now be stabilized recentered automatically (the signal should be positioned within one division of the center of display).

6. If the signal jumps off screen, push the SIGNAL CENTER control and adjust until the signal is within 2 divisions of center. It should be noted that there are 1 MHz steps between adjacent phase locks in fundamental mixing modes.

7. Readjust the TUNING control to center the signal.

8. Reduce the SCAN WIDTH/DIV control as desired, centering the signal with the TUNING control if necessary.

3-21. BROADBAND SPECTRUM ANALYSIS. The AILTECH 757 Spectrum Analyzer provides two means by which large segments of the microwave frequency spectrum may be examined. These are: (1) full range scan and (2) the calibrated MHz scan widths. The full range scan provides a display of the entire frequency spectrum indicated by the

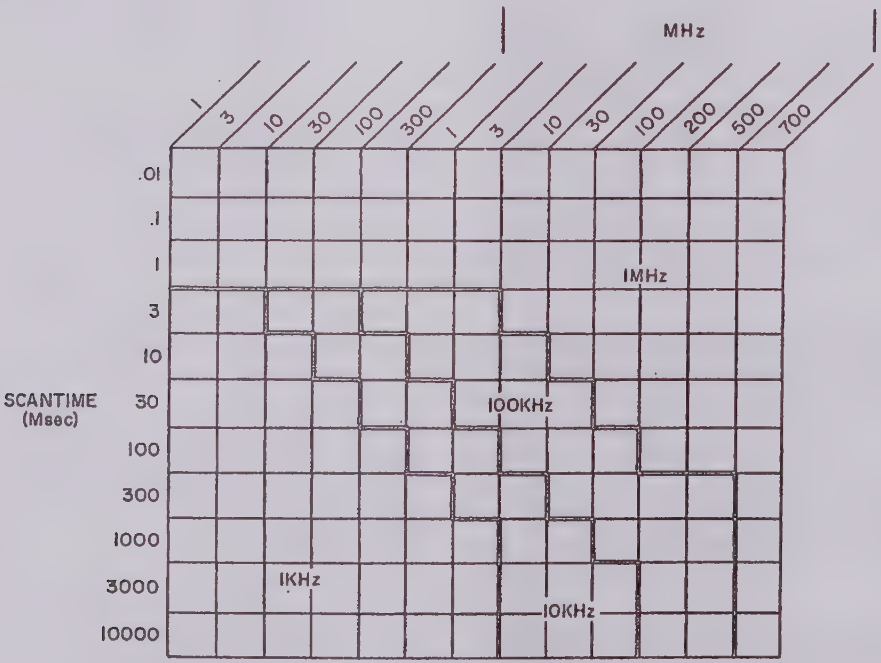


Figure 3-3. IF BANDWIDTH Selected by Spectrum Analyzer in AUTO Position

setting of the RF RANGE (GHz) control. The preliminary control settings of Table 3-3 will set the analyzer for this mode of operation. Turn the FULL RANGE ON/OFF control clockwise to the ON position. When the signal of interest is connected to the RF INPUT it should be visible on the CRT if it is within the RF range selected. A triangular marker notch will also appear on the baseline of the display. The position of the notch is set by the TUNING control, and the marker frequency is displayed by the digital CENTER FREQUENCY (MHz) readout. If it is desired to examine a particular segment of the full RF range in greater detail, proceed as follows:

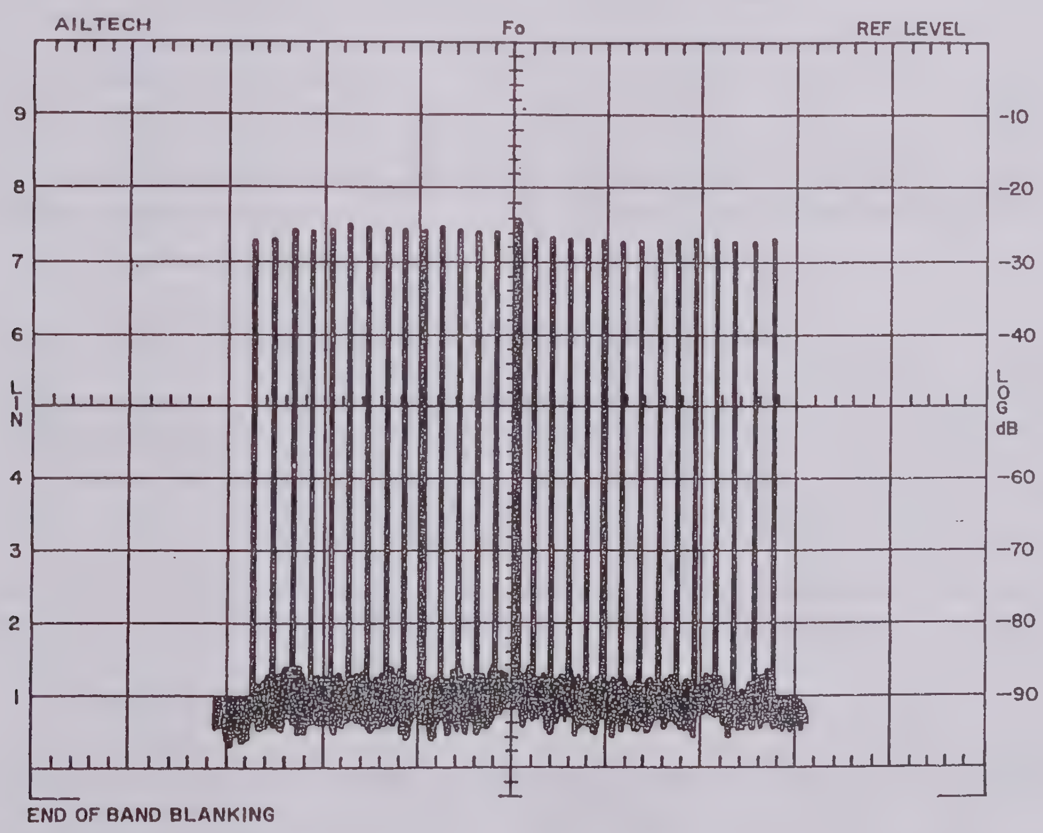
1. Adjust the marker position until it is directly under the signal of interest (indicated by a dip in signal amplitude).

2. Set the SCAN WIDTH/DIV control for the desired spectrum width (MHz/div scan widths only), calibrated from 1 KHz to 700 MHz per division.

3. Turn the FULL RANGE control to OFF.

4. The signal of interest will now appear near the center of the display. Adjust the TUNING control for exact centering.

3-22. There are combinations of RF RANGE, TUNING, and SCAN WIDTH/DIV settings which could result in portions of the display representing frequencies beyond the limits of the RF RANGE (GHz) control setting. If this condition should occur, the out-of-range areas are automatically blanked and the display will be less than a full 10 divisions. Figure 3-4 illustrates this condition.



F_0 = 3.0 GHz
RF RANGE CONTROL SET AT 1.8 – 4.0 GHz
SCAN WIDTH CONTROL SET AT 500 MHz/DIV

Figure 3-4. Automatic Out-of-Range Blanking

SECTION 4

PERFORMANCE TESTS AND CALIBRATION

4-1. INTRODUCTION

4-2. This section details the calibration procedures necessary to verify that the instrument is operating within its prescribed performance limits. AILTECH recommends that these procedures be performed every six months or 1000 hours of operation.

NOTE

This section contains calibration procedures only. Refer to Section 6 for alignment and adjustment, or Section 7 for service, if required.

4-3. This section is divided as follows:

a. Calibration Description – a tabular presentation of the instruments characteristics, performance specifications, and test methods.

b. Equipment Requirements – a list of the required calibration equipment including its generic name, minimum use specification, and a recommended manufacturer and model.

c. Preliminary Operations – includes warm-up instructions and equipment connections that are preliminary to the complete calibration process.

d. Calibration Process – describes in detail the procedures required to perform the complete calibration process.

4-4. IDENTIFICATION AND DESCRIPTION

4-5. Table 4-1 summarizes the tests to be performed to ensure that the AILTECH 757 Spectrum Analyzer meets these specifications.

Table 4-1. Calibration Description

Test Instrument Characteristics	Performance Specifications	Test Method
RF Attenuator	±1 dB per 10 dB step ±2 dB cumulative	Comparison with a calibrated external attenuator
IF Attenuator	±0.2 dB per 1 dB step ±0.5 dB cumulative	Comparison with a calibrated external attenuator
	±0.250 dB per 10 dB step ±1.0 dB cumulative	
Log Display Accuracy	±0.25 dB/dB but not more than ±2 dB over full 100 dB range	Comparison with a calibrated external attenuator
Reference Level and Calibration Signal Level	±1 dB	Measuring calibration signal level by substitution and calibrating reference level readout.

Table 4-1. Calibration Description (Continued)

Test Instrument Characteristics	Performance Specifications	Test Method
Sensitivity:		Determination of the average level of the noise trace by using calibrated Reference Level and Display.
Band 1	-105 dBm/kHz (125 dBm/kHz	
Band 2	-110 dBm/kHz if 001 option is	
Band 3	-105 dBm/kHz included)	
Band 4	-100 dBm/kHz	
Band 5	-90 dBm/kHz	
Residual Responses	Less than -90 dBm referred to signals at the RF input	Measurement of any "signal" response level on display in the absence of input signals.
Center Frequency Accuracy:		Comparison with the signals received from a 100 MHz Comb Generator.
Band 1 1 MHz - 1 GHz	±6 MHz	
1 - 2 GHz	±8 MHz	
Band 2	±0.2%	
Band 3	±0.2%	
Band 4	±0.2%	
Band 5	±0.2%	
Scan Width Accuracy	±10% of total span	Comparison of signal spacing from frequency synthesizer and comb generator.
Frequency Response:		Application of a constant level, swept signal, throughout each band and observation of amplitude variations on the display.
Band 1	±1.5 dB	
Band 2	±2.0 dB	
Band 3	±2.5 dB	
Band 4	±2.5 dB	
Band 5	±3.0 dB	
IF Bandwidth Accuracy	1 kHz typically 1.3 kHz ±20% 10 kHz, 100 kHz ±10% 1 MHz typically 1.5 MHz ±20% Above S/N 700: 1 MHz ±20%	Energize internal calibrate generator and observe the 3 dB bandwidth on display.
Scan Time Accuracy	.01 msec/div. to 1 sec/div. ±10% 3 and 10 sec/div. ±20%	With the analyzer in the fixed tuned mode, observe a sine wave modulated signal on the display. Adjust the frequency of modulation such that each cycle is aligned with a graticule line. Measure the modulation frequency and calculate time.

Table 4-1. Calibration Description (Continued)

Test Instrument Characteristics	Performance Specifications	Test Method
Noise Sidebands for fundamental mixing using 1 kHz IF filter	Greater than 70 dB down 30 kHz from carrier 80 dB at 90 kHz away 90 dB at 300 kHz away 95 dB at 1 MHz away	Using the internal calibrate signal and observing the amplitude of the noise level at the various frequency separations.
Residual FM In phase-lock	Less than 200 Hz peak to peak	Using the linear skirt of the 1 kHz filter in the analyzer to discriminate signal installation.

4-6. TEST EQUIPMENT REQUIREMENTS

4-7. Table 4-2 summarizes the required test equipment and accessories for the complete calibration process. A minimum use specification column is included to assist in the selection of alternate equipment in the event the items in column 4 are not available. Satisfactory performance of alternate items must be verified prior to use. All applicable equipment must bear evidence of current calibration.

4-8. PRELIMINARY OPERATIONS

4-9. This paragraph includes the instrument control settings, cable connections and warmup instructions that are preliminary to the complete calibration process.

CAUTION

> Verify that the rear panel line voltage selector card is installed in its proper position for either 115 Vac or 230 Vac. Verify that the line fuse is of the proper rating for the line voltage selected.

1. Observe that two small jumper cables on the rear panel connect the 21.4 MHz INPUT to OUTPUT connectors J10 and J11, and the TUNING INPUT and OUTPUT connectors J8 and J9.

2. Energize the spectrum analyzer and allow a one hour warmup period before proceeding with the calibration tests of paragraph 4-10.

3. Verify that the rear panel fan is operational.

4. Verify that the CENTER FREQUENCY (MHz) readout is illuminated.

5. Set the front panel controls as follows and refer to paragraph 2-18 steps 4 through 6 and position the vertical ↕ and horizontal ↔ controls as indicated.

RF RANGE (GHz)	1.8 - 4.0
FULL RANGE	OFF
RF ATTEN (dB)	0
IF ATTEN (dB)	10
TUNING	3000 MHz
SCAN MODE	AUTO
SCAN WIDTH/DIV	10
SCAN TIME/DIV	3
IF BANDWIDTH (KHz)	AUTO
VERT SCALE/DIV	10
BYPASS	On
DOMAIN	FREQ
VAR VIDEO BW	Fully clockwise
SCAN WIDTH/DIV Vernier	Fully clockwise
SCAN TIME/DIV Vernier	Fully clockwise
EXPAND	NOISE

Table 4-2. Test Equipment Required

Item	Category	Minimum Use Specification	Recommended Equipment
1	Signal Generator	Frequency 1 MHz to 1 GHz, 5 kHz min resolution Stability ±100 Hz	AILTECH 360 Frequency Synthesizer
2	Swept Signal Generator	Frequency 100 MHz - 18 GHz Internal Leveling, Manual Sweep Control	AILTECH 6600/9514D/9515D
3	Swept Signal Generator	Frequency 1 MHz - 100 MHz Manual Sweep Control	Wavetek 2000
4	Swept Signal Generator	Frequency 18 - 22 GHz Manual Sweep Control	Hewlett Packard 8690/8696A
5	Function Generator	Frequency 0.1 Hz - 100 kHz	Wavetek 180
6	Comb Generator	Frequency 100 MHz - 20 GHz Signal spacing 100 MHz	AILTECH 70790
7	Precision Attenuator	Frequency 21.4 MHz Accuracy ±.1 dB Range 80 dB	AILTECH 3220-2
8	Amplifier	Frequency 21.4 MHz Gain 20 dB	Hewlett Packard 461A
9	Power Meter	Frequency 1 MHz - 18 GHz	Boonton 42B/41-4E
10	Counter	Frequency DC-100 kHz	Systron Donner 6150
11	Frequency Meter	Frequency Range 1 - 4 GHz	Hewlett Packard 536A
12	Frequency Meter	Frequency Range 4 - 12.4 GHz	Hewlett Packard 537A
13	Frequency Meter	Frequency Range 12.4 - 18 GHz	Hewlett Packard 532A
14	Termination	50 ohm	Omni Spectra 3001-61-00-00
15	Comb Generator	Frequency Increment 1, 10, 100 MHz Frequency Accuracy ±.01%	Hewlett Packard 8406
16	Oscilloscope	Bandwidth DC - 200 MHz	Tektronix 475A
17	Oscilloscope	Differential Input 200 MV/div	Tektronix 502

Table 4-2. Test Equipment Required (Continued)

Item	Category	Minimum Use Specification	Recommended Equipment
18	Digital Multimeter	4½ Digits	Systron Donner 7004A
19	Resistive Decade Box	1MΩ Maximum resistance	General Radio Type 1433B
20	Tracking Generator	.001 - 12.4 GHz	AILTECH 70727

6. Observe the noise baseline that extends horizontally across the display at about 70 to 80 dB graticule lines.

CAUTION

Use care when working near the CRT. Avoid striking it with any object that might cause it to crack or implode.

7. Rotate the BASELINE control clockwise and observe that the noise baseline disappears.

8. Rotate the CONTRAST control clockwise and observe that the noise baseline can be brought back with variable intensity.

9. Press CALIBRATE to energize the calibration signal generator. Observe that a signal is present near mid-screen.

10. Set in sufficient IF attenuation to reduce the signal to the 50 dB graticule line. Set the VERT SCALE/DIV to 5 and verify that the signal extends within one division of the 0 dB graticule.

11. Set in additional IF attenuation to reduce the signal to the 60 dB graticule line. Set the VERT SCALE/DIV to 2 and again verify that the signal extends to within one division of the 0 dB graticule.

12. Set VERT SCALE/DIV to LIN and observe that the signal peak remains at approximately the same position. Return the IF ATTEN to 10 and the VERT SCALE/DIV to 10.

13. Exercise the SCAN WIDTH/DIV control over the settings given below and verify the IF BANDWIDTH (KHz) AUTO operation by observing that the correct LED bandwidth indicator is selected.

SCAN WIDTH/DIV	SCAN TIME/ DIV	IF BANDWIDTH (KHz)
10 MHz, and above	3 msec	1000
3,1 MHz and 300 kHz	3 msec	100
100, 30 kHz	3 msec	10
10 kHz and below	3 msec	1

14. Set the SCAN WIDTH/DIV to 10 MHz and the IF BANDWIDTH (KHz) to AUTO positions.

15. Rotate the VAR VIDEO BW control slowly counterclockwise and note that the amplitude of the noise baseline and the signal is greatly reduced. Return the VAR VIDEO BW fully clockwise until locked.

16. Set SCAN MODE to LINE position and observe that a display trace still appears (with possibly more flicker).

17. Set SCAN MODE to SINGLE position. Press concentric control and verify that a single trace is obtained.

18. Set SCAN MODE to MAN position. Rotate concentric control and observe that the trace can be manually positioned on display. Return SCAN MODE to AUTO position.

19. Set the SCAN TIME/DIV to 100 msec. Press BYPASS pushbutton. Observe that the display is now flicker free indicating digital mode operation.

20. Press READOUT DISABLE pushbutton and observe that the alphanumeric readout shown on the CRT are now blanked.

21. Turn off CALIBRATE and return controls to positions given in step 5.

4-10. CALIBRATION PROCESS

NOTE

> Unless otherwise specified, verify the results of each test and take corrective action whenever the test requirement is not met, before proceeding with the procedure. Refer to Sections 6 and 7 for detailed alignment and troubleshooting procedures.

4-11. RF ATTENUATOR 1A2A14. To calibrate the RF attenuator, proceed as follows:

Test Equipment Required

Signal Generator	AILTECH 360
Precision Attenuator	AILTECH 3220-2

1. Connect the test set-up as shown in Figure 4-1. The precision attenuator is placed between the 21.4 MHz IN and OUT connectors, J10 and J11 respectively on the rear panel. Add a fixed 10 dB attenuator between the signal generator and RF input of spectrum analyzer to minimize mismatch uncertainties and initially set the precision attenuator to 60 dB.

2. Set the front panel controls as follows:

RF RANGE (GHz)	.001 –2.0
FULL RANGE	OFF
RF ATTEN (dB)	0
IF ATTEN (dB)	40
TUNING	100 MHz
SCAN MODE	AUTO
SCAN WIDTH/DIV	10
SCAN TIME/DIV	3
IF BANDWIDTH (KHz)	AUTO
VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	2 LOG
EXPAND	NOISE
SIGNAL IN	On
A	On

3. Adjust the signal generator for an output signal of 100 MHz, with an output level of –5 dBm so that the signal power into the spectrum analyzer is –15 dBm. If the instrument is equipped with a 001 Increased Sensitivity Option, the generator should be set for an output level of –25 dBm, so that the input level to the analyzer is –35 dBm.

4. Adjust TUNING control if required to center signal on display.

5. Set SCAN WIDTH/DIV to 300 KHz and recenter signal as required by TUNING control.

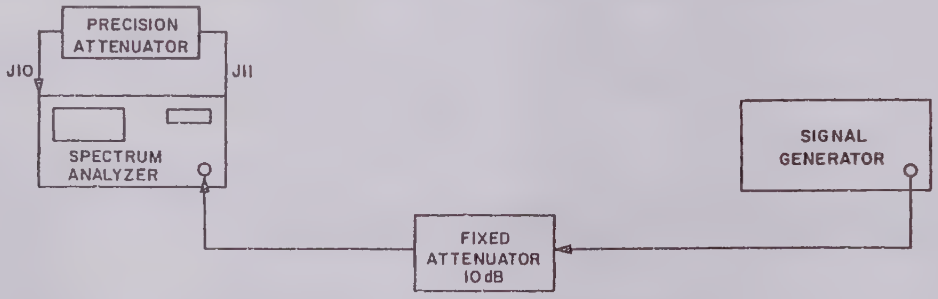


Figure 4-1. RF Attenuator Test Set-Up

6. Set IF BANDWIDTH (KHz) to 100 and VAR VIDEO BW fully counterclockwise.

7. Set DOMAIN control to TIME position and adjust fine TUNING until the horizontal trace reaches a peak position on the display.

8. Slightly adjust signal power until a suitable reference line is attained; e.g., 40 dB.

9. Add 10 dB to the RF ATTEN (dB) and remove attenuation from the precision attenuator until the signal is again at the reference. Read the amount of attenuation removed and record the difference.

10. Reset the precision attenuator to 50.0 dB and if necessary, adjust signal power until reference is again established. Repeat step 9.

11. Continue for remaining four attenuator steps.

12. Reestablish reference line and exchange entire 60 dB between attenuators in one step to measure cumulative error. Record deviation.

4-12. IF ATTENUATOR 1A2A13. To check the IF Attenuator 1A2A13, proceed as follows:

Test Equipment Required

Signal Generator	AILTECH 360
Precision Attenuator	AILTECH 3220-2
Amplifier	Hewlett Packard 461A

1. Connect test set-up as shown in Figure 4-2. Connect the external precision attenuator between the 21.4 MHz IN and OUT connectors J10 and J11 on the rear panel without the 461A amplifier.

2. Set the front panel controls and switches as follows:

RF RANGE (GHz)	.001 - 2.0
FULL RANGE	OFF
RF ATTEN (dB)	10
IF ATTEN (dB)	0
TUNING	100 MHz
SCAN MODE	AUTO
SCAN WIDTH/DIV	10
SCAN TIME/DIV	3
IF BANDWIDTH (KHz)	AUTO
VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	2 LOG
EXPAND	NOISE
SIGNAL IN	On
A	On

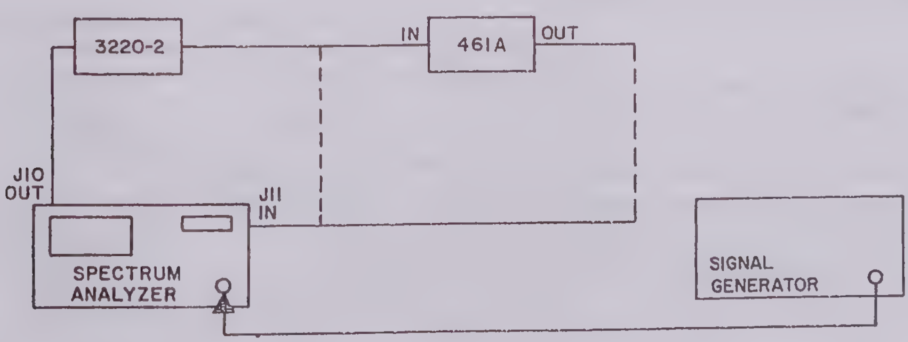


Figure 4-2. IF Attenuator, and Display Accuracy Test Set-Up

3. Adjust the signal generator for an output signal of 100 MHz, with an output level of –5 dBm so that the signal power into the spectrum analyzer is –15 dBm. If the instrument is equipped with a 001 Increased Sensitivity Option, the generator should be set for an output level of –25 dBm, so that the input level to the analyzer is –35 dBm.

4. Adjust TUNING control as required to center signal on display.

5. Set SCAN WIDTH/DIV setting to 300 kHz. Recenter signal as required by using TUNING control.

6. Set IF BANDWIDTH (KHz) to 100 and VAR VIDEO BW control fully counterclockwise.

7. Set DOMAIN control to TIME position and adjust TUNING control until the horizontal line reaches a peak position on the display.

8. Adjust the signal power until a suitable reference line is attained; e.g., 60 dB.

9. Add 1 dB to the IF ATTEN (dB) control and remove attenuation from the precision attenuator until the signal is again at the reference. Read the amount of attenuation removed and record deviation from 1 dB.

10. Reset precision attenuator to 79 dB and if necessary, adjust signal power until reference is again established. Repeat step 9.

11. Continue reducing the precision attenuator in 1 dB steps (78, 77 etc.) and repeat step 9 until the entire 10 dB has been checked. Reset the IF attenuator to 0 dB.

12. Reset precision attenuator to 80 dB, repeat step 8 and exchange entire 10 dB between attenuators in one step to measure cumulative error. Record deviation.

13. Reset precision attenuator to 80 dB and reestablish reference line.

14. Add 10 dB to the IF ATTEN (dB) control and remove attenuation from the precision attenuator until the signal is again at the reference. Read the amount of attenuation removed and record deviation from 10 dB.

15. Reset precision attenuator to 70 dB and adjust signal power until reference is again established. Repeat step 14.

16. Continue reducing the precision attenuator in 10 dB steps similar to step 11 and repeat step 14 until the first 80 dB of attenuation has been checked.

17. Reset precision attenuator to 80 dB, IF ATTEN control to 0 and exchange entire 80 dB between attenuators in one step to measure cumulative error.

18. Connect the HP461A amplifier between the output of the precision attenuator and rear panel connector 1A3J11. Set the amplifier for 20 dB gain, precision attenuator to 60 dB and the IF ATTEN control to 80 dB and adjust the signal power until the reference is again established.

19. Continue the substitution of the final 20 dB as per steps 14, 15 and 16.

20. Reset precision attenuator to 60 dB, IF ATTEN to 80 dB and exchange entire 20 dB between attenuators in one step to measure the cumulative error.

21. Add cumulative error of step 17 to that of step 20.

4-13. DISPLAY ACCURACY. To calibrate the display accuracy, proceed as follows:

Test Equipment Required

Signal Generator	AILTECH 360

1. Connect test set-up as shown in Figure 4-2 and connect jacks J10 and J11 directly.

2. Set the front panel controls as follows:

RF RANGE	.001 - 2.0
FULL RANGE	OFF
RF ATTEN (dB)	10
IF ATTEN (dB)	0
TUNING	100 MHz
SCAN MODE	AUTO

SCAN WIDTH/DIV	10
SCAN TIME/DIV	3
IF BANDWIDTH (KHz)	AUTO
VERT SCALE/DIV	10
SIGNAL IN	On
A	On

3. Set the IF ATTEN (dB) to 100 and the VAR VIDEO BW control fully counterclockwise. Adjust the vertical positioning control on the display (‡) until the noise baseline is centered on the 102 dB graticule mark.

4. Set IF ATTEN (dB) to 0, VAR VIDEO BW control fully clockwise and adjust signal generator for full scale deflection approximately 0 dBm at 100 MHz. (-20 dBm with 001 option).

5. Adjust TUNING control as required to center signal on display.

6. Set SCAN WIDTH/DIV setting to 300 KHz, recentering signal as required by TUNING control.

7. Set IF BANDWIDTH (KHz) to 100 and VAR VIDEO BW control fully counterclockwise.

8. Set DOMAIN to TIME position and adjust TUNING control until the horizontal line reaches peak position on the display.

9. Adjust signal power until the trace is exactly aligned with the 0 dB graticule line.

10. Add 10 dB to the IF attenuator and note the deviation from the 10 dB line. Record deviation.

11. Adjust signal power until trace is exactly on the 10 dB line and add another 10 dB with the IF attenuator. Record deviation from 20 dB line.

12. Reestablish reference and continue in 10 dB increments until 90 dB has been reached.

NOTE

Last 10 dB is close to the noise and could have an additional 1 to 2 dB error.

13. Return IF attenuator to 0 and adjust signal power as required to set trace exactly on 0 dB line.

14. Add entire 90 dB in one step and measure cumulative deviation from 90 dB line.

4-14. REFERENCE LEVEL AND CALIBRATION SIGNAL LEVEL. To calibrate the reference level and calibration signal level, proceed as follows:

Test Equipment Required

Swept Signal Generator	AILTECH 6600/ 9514D/9515D
Power Meter	Boonton 42B/41-4E

1. Connect the test set-up as shown in Figure 4-3.

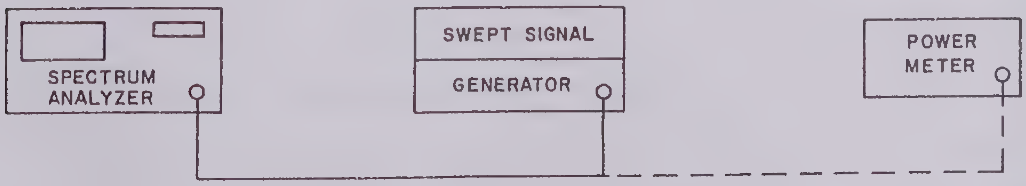


Figure 4-3. Reference Level and Calibration Signal Level Test Set-Up

2. Set the front panel controls as follows:

RF RANGE (GHz)	.001 –2.0
FULL RANGE (GHz)	OFF
RF ATTEN (dB)	30
IF ATTEN (dB)	0
TUNING	1000 MHz
SCAN MODE	AUTO
SCAN WIDTH/DIV	10
SCAN TIME/DIV	3
IF BANDWIDTH (KHz)	AUTO
VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	10
SIGNAL IN	On
A	On

3. Repeat paragraph 4-13 step 3 and verify that noise line is on 102 dB graticule mark. Set IF ATTEN (dB) control to 0.

4. Energize the internal calibration signal by pushing CALIBRATE and adjust TUNING control to center signal on display. If required, peak signal using SIGNAL center control.

NOTES

Small spurious signals may also appear on the display; however, this is normal when using the internal calibrate signal generator in band 1.

Refer to paragraph 3-11 for instructions on making this measurement.

Set the RF ATTEN (dB) control as follows for each frequency.

CENTER FREQUENCY (MHz)	RF ATTEN (dB)
1000	30
3000	10
5800	0
8900	0
16000	0

5. Adjust the IF ATTEN (dB) control to position the signal at a convenient reference; e.g., 0 or 10 dB line.

6. Turn off the internal calibrate signal generator by pushing calibrate switch and connect the external signal generator. Adjust its output for the same amplitude and frequency as observed in step 5.

7. Disconnect the signal generator and measure its output power with the power meter. Verify that this value is the same (±1 dB) as that on the operating instruction card.

8. Verify that the reference level readout on the CRT is within ±1 dB of this value.

9. Repeat steps 4 through 7 for the following frequencies:

Band 2	3000 MHz
Band 3	5800 MHz
Band 4	8900 MHz
Band 5	16000 MHz

4-15. SENSITIVITY. The sensitivity is defined as the average level of the spectrum analyzer's internally generated noise with a 1 KHz IF bandwidth selected. The measurement is made using the reference level that was calibrated in paragraph 4-14.

Test Equipment Required

None

1. Set the front panel controls as follows:

RF RANGE (GHz)	.001 –2.0
FULL RANGE	OFF
IF ATTEN (dB)	0
RF ATTEN (dB)	0
TUNING	1000 MHz
SCAN MODE	AUTO
SCAN WIDTH/DIV	10
SCAN TIME/DIV	3
IF BANDWIDTH (KHz)	1

VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	10
BYPASS	On

2. Record the power level of the noise trace by counting the number of divisions in dB below the reference level (0 dB graticule line). Algebraically add this number to the reference level as indicated on the alphanumeric readout of absolute power (REF LEVEL).

Example:

If the reference level was -20 dBm and the noise trace is approximately at the 90 dB line, its absolute value is (-20 -90 = -110 dBm).

3. Change the RF RANGE (GHz) control and repeat this measurement for the following frequencies:

Band 2	3000 MHz
Band 3	5800 MHz
Band 4	8900 MHz
Band 5	16000 MHz

4-16. RESIDUAL RESPONSES. This test verifies that there are no internally generated signals that appear above the absolute power level of -90 dBm.

Test Equipment Required

Termination, 50 ohm	Omni Spectra 3001-6100-00

1. Set the front panel controls as follows:

RF RANGE (GHz)	.001 - 2.0
FULL RANGE	OFF
IF ATTEN (dB)	0
RF ATTEN (dB)	0
TUNING	0
SCAN MODE	AUTO
SCAN WIDTH/DIV	1 MHz
SCAN TIME/DIV	30 msec
IF BANDWIDTH (KHz)	10
VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	10
BYPASS	On

2. Adjust the IF ATTEN (dB) control so that the reference level is 0 dBm.

3. Terminate the RF INPUT connector with a 50Ω termination.

4. Slowly tune the spectrum analyzer through the entire frequency range and check that no spurious signals extend above the 90 dB graticule line.

NOTE

At 0 frequency, a large signal will be observed. This is normal and is not to be considered as a residual spur.

5. Repeat step 4 for frequency ranges 1.8 - 4.0 GHz and 3.3 - 8.3 GHz.

6. Set the IF BANDWIDTH (KHz) to 1. Repeat step 4 for the 5.4 - 12.4 GHz and 10 - 20 GHz ranges.

4-17. FREQUENCY ACCURACY. Perform the following procedure:

Test Equipment Required

Comb Generator	AILTECH 70790
Frequency Meter	Hewlett Packard 536A, 537A, 532A

1. Set the front panel controls as follows:

RF RANGE (GHz)	.001 - 2.0
FULL RANGE	OFF
RF ATTEN (dB)	30

IF ATTEN (dB)	10
TUNING	100 MHz
SCAN MODE	AUTO
SCAN WIDTH/DIV	10
SCAN TIME/DIV	3
IF BANDWIDTH (KHz)	AUTO
VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	10
SIGNAL IN	On
A	On
FREQ ADJ	Centered

NOTE

It is good practice to rotate the SCAN WIDTH/DIV control clockwise to 700 MHz and then counterclockwise to 10 MHz to eliminate any hysteresis that might have accumulated in the Yig components for each frequency measured.

2. Adjust the horizontal positioning control of the display (marked ←→) such that the beginning of the trace coincides with the first vertical graticule line at the left edge of the display.

3. Connect the comb generator (item 6, Table 4-2) as shown in Figure 4-4.

4. Use the TUNING control and position the first comb line to the right of the spectrum analyzer's zero beat exactly at the center of the display. Record the number given by the CENTER FREQUENCY (MHz) readout.

5. Repeat step 4 centering the 10th comb line for a nominal 1000 MHz.

6. Repeat step 4 centering the 20th comb line for a nominal 2000 MHz.

7. Insert the frequency meter (item 11, Table 4-2) in the test set-up as shown in Figure 4-5.

8. Set the RF RANGE (GHz) control to 1.8 – 4.0 and the RF ATTEN (dB) control to 10.

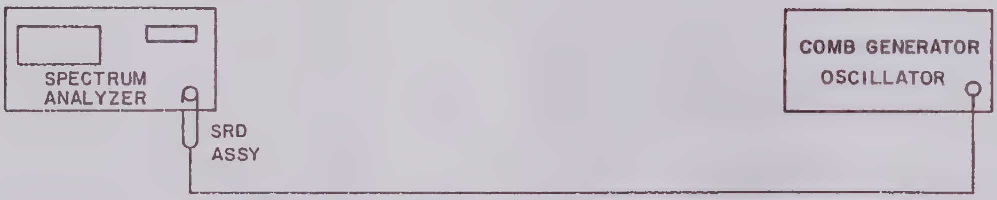


Figure 4-4. Frequency Accuracy with Comb Generator Test Set-Up

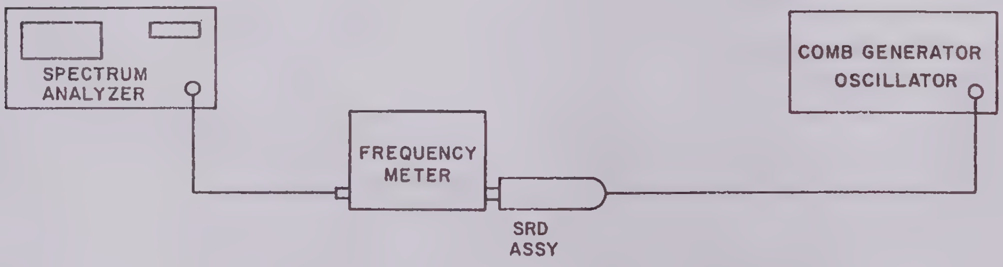


Figure 4-5. Frequency Accuracy with Frequency Meter Test Set-Up

9. Locate the 1800 MHz line with the frequency meter. Adjust the TUNING control to center this signal on the display and record the number of the CENTER FREQUENCY (MHz) readout.

NOTE

> If the SCAN WIDTH/DIV control is changed to help locate this line, always rotate it fully clockwise to 700 MHz, then back to 10 MHz before making a frequency measurement.

10. Repeat step 9 for 3000 MHz and 4000 MHz.

11. Replace the frequency meter with (item 12, Table 4-2) and set the RF RANGE (GHz) control to 3.3 – 8.3.

12. Repeat steps 9 and 10 for 3300, 5800 and 8300 MHz.

13. Turn RF RANGE (GHz) to 5.4 – 12.4 and measure frequency at 5400, 8900 and 12400 MHz.

14. Turn RF RANGE (GHz) to 10 – 22. Measure frequency at 10 GHz. Set RF ATTEN (dB) control to 0 position.

15. Substitute frequency meter (item 13, Table 4-2). Measure frequency at 16 and 20 GHz.

NOTE

> The amplitude of the harmonic signals is low at the high end of Band 5. Therefore, a measurement of 22 GHz will, in most cases, be impractical. An increase in signal-to-noise ratio of 10 dB can be obtained by setting the SCAN WIDTH/DIV control to the 3 MHz position.

4-18. SCAN WIDTH ACCURACY. This test is divided into two measurement techniques. The wide dispersions, 100 MHz and above are checked with a comb generator. The narrower dispersions are checked with a frequency synthesizer.

Test Equipment Required

Frequency Synthesizer	AILTECH 360
Swept Signal Generator	AILTECH 6600/ 9514D/9515D

1. Connect the test equipment as shown in Figure 4-6 using the swept generator.

2. Set the front panel controls as follows:

RF RANGE (GHz)	5.4 – 12.4
FULL RANGE	OFF
RF ATTEN (dB)	2
IF ATTEN (dB)	10
TUNING	8900 MHz
SCAN MODE	AUTO
SCAN WIDTH/DIV	100 MHz
SCAN TIME/DIV	10 msec
IF BANDWIDTH (KHz)	AUTO
VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	10
SIGNAL IN	On
A	On

3. Adjust the sweep generator for cw operation. Set the output for 8900 MHz at 0 dBm.

4. Adjust the front panel TUNING control as required to align the signal with the left most vertical graticule line. Note the CENTER FREQUENCY (MHz) readout.

5. Readjust the TUNING control until the signal is aligned with the right most vertical graticule line. Note the CENTER FREQUENCY (MHz) readout.

6. Subtract the frequency reading obtained in step 5 from that in step 4 and record the difference.

7. Set the SCAN WIDTH/DIV control to 200 MHz position and repeat steps 4, 5 and 6.

8. Set the SCAN WIDTH/DIV control to 500 MHz position and repeat steps 4, 5 and 6.

9. Set the SCAN WIDTH/DIV control to 700 MHz position and repeat steps 4, 5 and 6.

10. Connect the test equipment as shown in Figure 4-6 using the frequency synthesizer.

11. Reset the following front panel controls as follows:

RF RANGE (GHz)	.001 – 2.0
SCAN WIDTH/DIV	30 MHz
TUNING	1000 MHz

12. Adjust the frequency synthesizer for an output signal of -30 dBm at 1000 MHz.

13. Adjust the TUNING control to align the signal with the center vertical graticule line.

14. Change the frequency of the frequency synthesizer in order to align the signal with the rightmost graticule line. Note the frequency reading of the synthesizer.

15. Again change the frequency of the synthesizer in order to align the signal with the left most graticule line. Note the frequency reading of the synthesizer.

16. Subtract the frequency reading in step 15 from that in step 14 and record the difference.

17. Repeat steps 14, 15 and 16 for each SCAN WIDTH/DIV in Table 4-3.

4-19. FREQUENCY RESPONSE. This test is divided into three frequency areas. The first covers the frequency range from .001 to 100 MHz; the second from 100 MHz to 18 GHz; the third from 18 – 22 GHz.

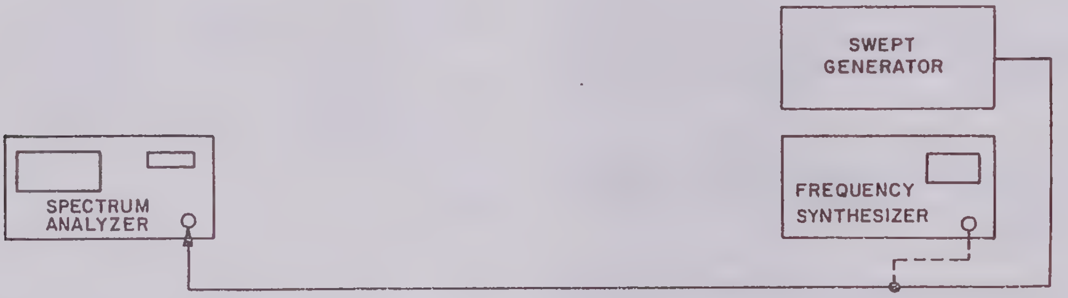


Figure 4-6. Scan Width Accuracy Test Set-Up

Table 4-3. Scan Width Accuracy Test

Scan Width/Div	Low Freq	HI Freq	Δ Freq. = Synthesizer Reading – HI Freq.
30 MHz	850 MHz	1150 MHz	Record
10 MHz	950 MHz	1050 MHz	Record
3 MHz	985 MHz	1051 MHz	Record
1 MHz	995 MHz	1005 MHz	Record
300 kHz	998.5 MHz	1001.5 MHz	Record
100 kHz	999.5 MHz	1000.5 MHz	Record
30 kHz	999.85 MHz	1000.15 MHz	Record
10 kHz	999.95 MHz	1000.05 MHz	Record
3 kHz	999.985 MHz	1000.015 MHz	Record
1 kHz	999.995 MHz	1000.005 MHz	Record

Test Equipment Required

Sweep Generator	Wavetek 2000
Sweep Generator	AILTECH 6600/ 9514D/9515D
Sweep Generator	Hewlett Packard 8690/8696A
Power Meter	Boonton 42B/41-4E

1. Connect the test equipment as shown in Figure 4-7.

2. Set the front panel controls of the analyzer as follows:

RF RANGE (GHz)	.001 – 2.0
FULL RANGE	OFF
RF ATTEN (dB)	10
IF ATTEN (dB)	0
TUNING	50 MHz
SCAN MODE	AUTO
SCAN WIDTH/DIV	10
SCAN TIME/DIV	10 msec
IF BANDWIDTH (KHz)	100
VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	2 LOG
EXPAND	REF
SIGNAL IN	On
A	On

3. Set the sweep generator (item 3, Table 4-2– for an output power level of -20 dBm at 50 MHz. (Use -50 dBm if the unit is equipped with a 001 option.)

4. Adjust IF ATTEN (dB) control for a convenient reference level, (i.e., 50 dB), on the display.

5. Manually sweep the generator through the range of 1 to 100 MHz and find the maximum on screen display of the signal after assuring that its power level remains constant by first monitoring with the power meter. Depress the HOLD pushbutton at the maximum point.

6. Depress B VIEW A pushbutton and again manually sweep the generator through the range of 1 to 100 MHz. Find the minimum on screen display of the signal. Depress SAVE and RECALL pushbuttons.

7. The display now shows two signals representing the maximum and minimum points on the frequency response curve. Record the difference between the two signals.

8. Replace the signal generator, item 3, Table 4-2, with signal generator, item 2, Table 4-2, and reset the front panel controls as follows:

TUNING	1000
SCAN WIDTH/DIV	200 MHz
IF BANDWIDTH (KHz)	AUTO
SIGNAL IN	On
A	On

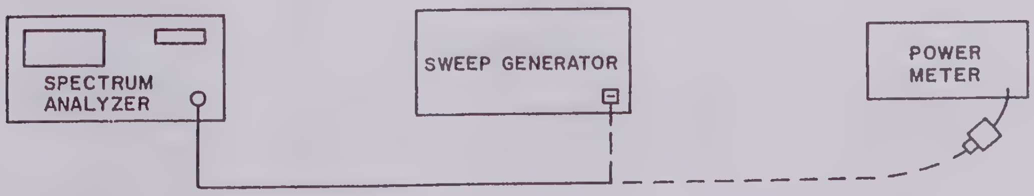


Figure 4-7. Frequency Response Test Set-Up

9. Repeat steps 3 through 7 setting the power level at 1000 MHz and the sweep range 100 to 2000 MHz. Record the difference between signal amplitudes. Set the power level at -20 dBm.

10. Repeat the above steps per Table 4-4.

NOTE

In order to ensure that preselector is peaked it may be necessary to adjust SIGNAL CENTER control during scan.

11. Replace the swept signal generator item 2, Table 4-2 with item 4, Table 4-2.

12. Set sweep generator output signal for -10 dBm at 18 GHz to complete Band 5.

4-20. IF BANDWIDTH ACCURACY. To calibrate the accuracy of the IF Bandwidth, proceed as follows:

Test Equipment Required

None

1. Set the front panel controls as follows:

RF RANGE (GHz)	1.8 – 4.0
FULL RANGE	OFF
RF ATTEN (dB)	10
(If Equipped with 001 Option)	30
IF ATTEN (dB)	10
TUNING	3000 MHz
SCAN MODE	AUTO
SCAN WIDTH/DIV	1 MHz
SCAN TIME/DIV	10 msec
IF BANDWIDTH (KHz)	1000
VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	2 LOG
EXPAND	REF
SIGNAL IN	On
A	On

2. Depress CALIBRATE pushbutton to energize the internal calibrate signal generator and position signal at the center of the display.

3. Adjust IF ATTEN (dB) control to position top of signal at a convenient reference (i.e., 35 dB graticule level).

4. Observe the width of the signal 1 and 1/2 major divisions below the top (e.g., the center graticule one for above reference). Record the width.

Table 4-4. Frequency Response Tests

RF RANGE (GHz)	TUNING (MHz)	SCAN WIDTH/DIV
1.8 – 4.0	2800/3000	500 MHz
3.3 – 8.3	5800	500 MHz
5.4 – 12.4	8900	700 MHz
10 – 18	13500/14500	700 MHz
18 – 22	20000	700 MHz

5. Set SCAN WIDTH/DIV to 100 KHz, set IF BANDWIDTH (KHz) to 100 and adjust TUNING control as required to center signal.

6. Repeat steps 4 and 5.

7. Set SCAN WIDTH/DIV to 10 KHz, set IF BANDWIDTH (KHz) to 10 and adjust TUNING control as required to center signal.

8. Repeat steps 4 and 5.

9. Set SCAN WIDTH/DIV to 1 KHz, set IF BANDWIDTH (KHz) to 1 and adjust TUNING control as required to center signal.

10. Repeat steps 4 and 5.

4-21. SCAN TIME ACCURACY. To calibrate the accuracy of the scan time, proceed as follows:

Test Equipment Required

Signal Generator	AILTECH 6600/ 9514D/9515D
Function Generator	Wavetech 180
Counter	Systron Donner 6150 (dc)

1. Connect the test equipment as shown in Figure 4-8.

2. Set the front panel controls as follows:

RF RANGE (GHz)	1.8 – 4.0
FULL RANGE	OFF
RF ATTEN (dB)	30
IF ATTEN (dB)	50
TUNING	3000 MHz
SCAN MODE	AUTO
SCAN WIDTH/DIV	10
SCAN TIME/DIV	3
IF BANDWIDTH (KHz)	AUTO
VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	5 LOG
SIGNAL IN	On
A	On

3. Set the signal generator for a continuous wave signal at 3000 MHz with a power level of 0 dBm.

4. Position the signal at the center of the display using the TUNING control. Set DOMAIN to the TIME position and observe that a horizontal line appears on the display at the same amplitude as the peak of the signal in the frequency mode. If it does not, adjust the TUNING control to peak the response. Set SCAN TIME/DIV to 0.01 msec position.

5. Adjust the function generator for a sinusoidal output signal of approximately 100,000 Hz. Adjust the amplitude until the horizontal line on the display becomes a distorted sinusoid of approximately 3 main divisions peak to peak.

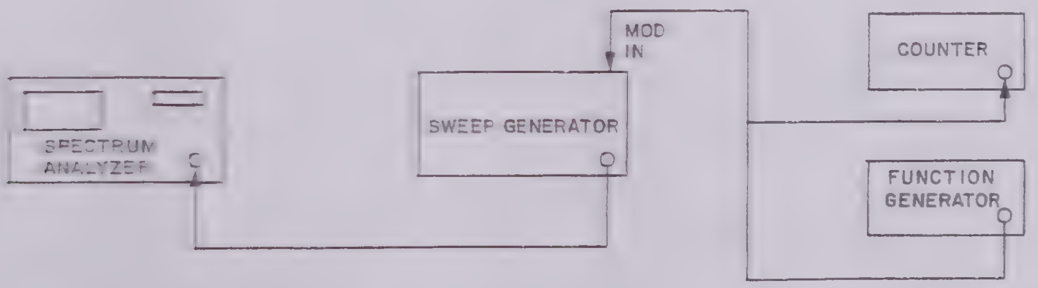


Figure 4-8. Scan Time Accuracy Test Set-Up

NOTE

The distortion results from the logging action of the display.

6. Set the SCAN MODE to VIDEO and adjust VIDEO TRIGGER control to synchronize the display. Adjust the horizontal position control of the display (⟷), to set the first modulation peak on the left-most graticule line.

7. Adjust the frequency of the function generator until the 11th modulation peak is positioned on the right-most graticule line.

NOTE

Steps 6 and 7 interact and some readjustments may be required to satisfy both requirements. Record the inverse of the frequency, (1/f), as measured by the counter.

8. Repeat steps 5, 6, and 7 to verify the remaining scan times using the settings given in Table 4-5.

4-22. NOISE SIDEBAND TEST. To perform the noise sideband tests, proceed as follows:

Test Equipment Required

None

1. Set the front panel controls as follows:

RF RANGE (GHz)	1.8 – 4.0
FULL RANGE	OFF
RF ATTEN (dB)	0
IF ATTEN (dB)	10
TUNING	3000 MHz
SCAN MODE	AUTO
SCAN WIDTH/DIV	10
SCAN TIME/DIV	3
IF BANDWIDTH (KHz)	AUTO

Table 4-5. Scan Time Accuracy Test

Scan Time/Div Control Setting	Function Generator Nominal Frequency
.1 msec	10,000 Hz
1 msec	1,000 Hz
3 msec	333.3 Hz
10 msec	100 Hz
30 msec	33.3 Hz
100 msec	10 Hz
300 msec	3.3 Hz
1 sec	1 Hz
3 sec	.33 Hz
10 sec	.1 Hz

VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	10
SIGNAL IN	On
A	On

2. Depress the CALIBRATE pushbutton to energize the internal calibrate signal generator.

3. Set the SCAN WIDTH/DIV to 10 KHz making adjustments with the TUNING control to keep the signal centered.

4. Set the IF BANDWIDTH (KHz) to 1 and the VAR VIDEO BW control sufficiently counterclockwise to smooth the trace. Set the SCAN TIME/DIV until the signal's amplitude is restored.

5. Record the level of the noise below the signal three major divisions (30 kHz) away.

6. Set the SCAN WIDTH/DIV to 30 KHz and record the level of the noise below the signal 90 kHz away.

7. Set the SCAN WIDTH/DIV to 100 kHz and IF BANDWIDTH (KHz) to 10 and record the level of the noise below the signal 300 kHz away.

8. Set the SCAN WIDTH/DIV to 300 kHz and record the level of the noise 1 MHz away.

4-23. RESIDUAL FM. This test uses the linear slope of the 1 kHz IF filter in the spectrum analyzer to convert an amplitude displacement to a frequency deviation.

Test Equipment Required

None

1. Set the front panel controls as follows:

RF RANGE (GHz)	1.8 – 4.0
FULL RANGE	OFF
RF ATTEN (dB)	10
IF ATTEN (dB)	60
TUNING	3000 MHz
SCAN MODE	AUTO
SCAN WIDTH/DIV	10
SCAN TIME/DIV	10 msec
IF BANDWIDTH (KHz)	1
VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	2 LOG
SIGNAL IN	On
A	On

2. Depress the CALIBRATE pushbutton to energize the internal calibrate signal generator.

3. Gradually step the SCAN WIDTH/DIV control to the 1 KHz position. Use the TUNING control to keep the signal at the center of the screen.

NOTE

> Adjust SIGNAL CENTER control for peak signal.

4. Choose either side of the IF filter trace and adjust the IF ATTEN (dB) control to obtain a linear slope of 10 vertical divisions at 1 kHz. (See Figure 4-9). Use only the linear portion of the waveform.

5. Calculate the detection sensitivity (or inverse slope of waveform) by dividing the horizontal displacement in Hz by the amplitude displacement in divisions, e.g., in trace shown in Figure 4-9.

$$\frac{800\ \text{Hz}}{10\ \text{DIV}} = 80\ \text{Hz/DIV}$$

6. Set the SCAN TIME/DIV to the 10 msec position and DOMAIN control to TIME position.

7. Adjust the TUNING control until the horizontal scan is at the 50 dB graticule line. Set SCAN MODE to SINGLE position and press PUSH SINGLE concentric control. A typical resultant waveform is shown in Figure 4-10. The amount of peak-to-peak amplitude variation is the residual FM and should be less than 200 Hz. For example in step 5, this would be 2 1/2 divisions. (For 100/300 Hz Filter Option refer to paragraph A-2 in Appendix A.)

4-24. SCAN MODE AND REAR PANEL CHECK. To perform the scan mode and rear panel check, proceed as follows:

Test Equipment Required

Function Generator	Wavetek 180
Oscilloscope	Tektronix 475A

1. Set the front panel switches and controls to the following settings.

RF RANGE (GHz)	1.8 – 4.0
RF ATTEN (dB)	0
IF ATTEN (dB)	10
SCAN TIME/DIV	3
SCAN WIDTH/DIV	30
IF BANDWIDTH (KHz)	AUTO
SCAN MODE	EXT TRIG
CALIBRATE	On
BYPASS	On

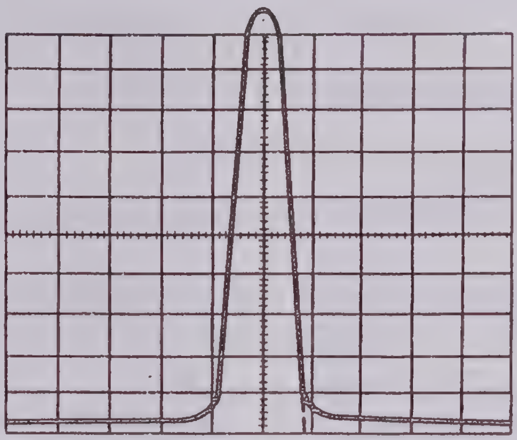
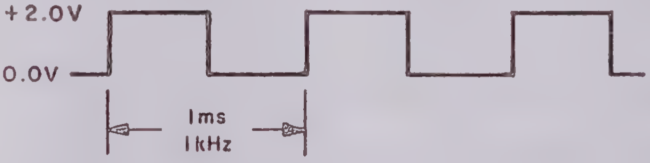


Figure 4-9. Residual FM Test Waveform

2. Set the function generator for the following conditions.

Pulse rate from function generator.

Rep Rate	1 kHz squarewave
Amplitude	2 volts positive
Dc Offset	0 volts



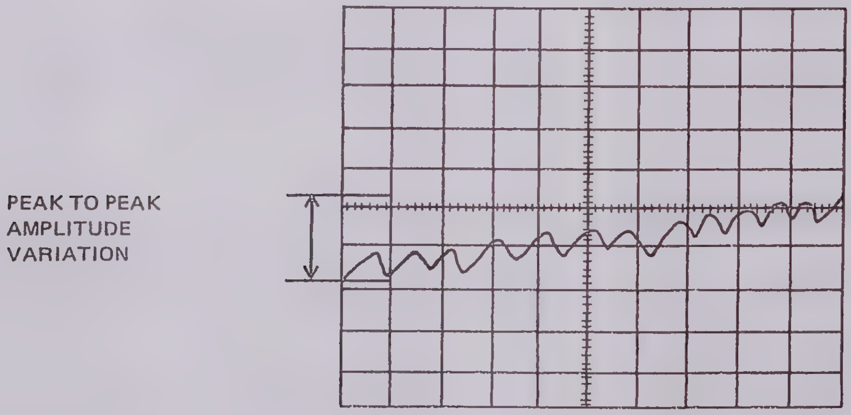


Figure 4-10. Residual FM Typical Waveform

3. Connect the output of the function generator to the EXT TRIG input connector J3 on rear panel 1A3 of the 757 Spectrum Analyzer. Three comb lines should appear on the CRT display at this time.

4. Move the cable from EXT TRIG connector J3 to EXT SWEEP connector J2. Set the SCAN MODE switch to EXT SWEEP position. Two lines should be present on the display.

5. Move the cable from EXT SWEEP connector J2 to EXT BLANK connector J1 on rear panel 1A3 of the Spectrum Analyzer and the SCAN MODE switch to the $\boxed{\text{AUTO}}$ position. There should be three broken comb line signals on the display.

6. Connect the input of an oscilloscope to the OUTPUT BLANK connector J4 on rear panel 1A3. A pulse of approximately 3 volts in amplitude should be present.

7. Connect the VIDEO OUTPUT connector J6 on rear panel 1A3 to the oscilloscope. With the SCAN MODE switch in the $\boxed{\text{AUTO}}$ position, three comb lines should be present on the oscilloscope. Move the IF ATTEN (dB) control to 40 position and observe that the signal displayed on the oscilloscope reduces in amplitude.

8. Move the cable from VIDEO OUTPUT connector J6 on rear panel 1A3 to SWEEP OUTPUT connector J5. Observe that a sawtooth waveform with an amplitude of approximately 6 volts appears on the oscilloscope.

Data Sheet

757 Spectrum Analyzer Serial Number________________

Date____________________________ Operator ____________________________

Test No.______________ Temp ________________ RH________________

Paragraph No.	Function Tested			Nominal Value	Measured Value	Performance Limits
4-11	RF Attenuator		0 - 10 dB	10 dB	______	9 to 11 dB
			10 - 20 dB	10 dB	______	9 to 11 dB
			20 - 30 dB	10 dB	______	9 to 11 dB
			30 - 40 dB	10 dB	______	9 to 11 dB
			40 - 50 dB	10 dB	______	9 to 11 dB
			50 - 60 dB	10 dB	______	9 to 11 dB
		Cum	0 - 60 dB	60 dB	______	58 to 62 dB
4-12	IF Attenuator		0 - 1 dB	1 dB	______	0.8 to 1.2 dB
			1 - 2 dB	1 dB	______	0.8 to 1.2 dB
			2 - 3 dB	1 dB	______	0.8 to 1.2 dB
			3 - 4 dB	1 dB	______	0.8 to 1.2 dB
			4 - 5 dB	1 dB	______	0.8 to 1.2 dB
			5 - 6 dB	1 dB	______	0.8 to 1.2 dB
			6 - 7 dB	1 dB	______	0.8 to 1.2 dB
			7 - 8 dB	1 dB	______	0.8 to 1.2 dB
			8 - 9 dB	1 dB	______	0.8 to 1.2 dB
			9 - 10 dB	1 dB	______	0.8 to 1.2 dB
		Cum	0 - 10 dB	10 dB	______	9.5 to 10.5 dB

Data Sheet

757 Spectrum Analyzer Serial Number________________

Paragraph No.	Function Tested		Nominal Value	Measured Value	Performance Limits
4-12 (Cont)	IF Attenuator (Cont)	10 - 20 dB	10 dB	______	9.75 to 10.25 dB
		20 - 30 dB	10 dB	______	9.75 to 10.25 dB
		30 - 40 dB	10 dB	______	9.75 to 10.25 dB
		40 - 50 dB	10 dB	______	9.75 to 10.25 dB
		50 - 60 dB	10 dB	______	9.75 to 10.25 dB
		60 - 70 dB	10 dB	______	9.75 to 10.25 dB
		70 - 80 dB	10 dB	______	9.75 to 10.25 dB
		80 - 90 dB	10 dB	______	9.75 to 10.25 dB
		90 - 100 dB	10 dB	______	9.75 to 10.25 dB
	Cum	0 - 100 dB	100 dB	______	99 to 101 dB
4-13	Display Accuracy	0 - 10 dB	10 dB	______	8 to 12 dB
		10 - 20 dB	10 dB	______	8 to 12 dB
		20 - 30 dB	10 dB	______	8 to 12 dB
		30 - 40 dB	10 dB	______	8 to 12 dB
		40 - 50 dB	10 dB	______	8 to 12 dB
		50 - 60 dB	10 dB	______	8 to 12 dB
		60 - 70 dB	10 dB	______	8 to 12 dB
		70 - 80 dB	10 dB	______	8 to 12 dB
		80 - 90 dB	10 dB	______	8 to 12 dB
	Cum	0 - 90 dB	90 dB	______	88 to 92 dB

Data Sheet

757 Spectrum Analyzer Serial Number ________________

Paragraph No.	Function Tested	Nominal Value	Measured Value	Performance Limits
4-14	Reference Level	-30 dBm	______	-29 to -31 dBm
	Calibration Signal Level	See Calibration Chart on Operating Instructions Card		
	1000 MHz		______	±1 dB
	3000 MHz		______	±1 dB
	5800 MHz		______	±1 dB
	8900 MHz		______	±1 dB
	16000 MHz		______	±1 dB
4-15	Sensitivity			
	Band 1	-105 dBm	______	-115 to -105 dBm
	Band 2	-110 dBm	______	-120 to -110 dBm
	Band 3	-105 dBm	______	-115 to -105 dBm
	Band 4	-100 dBm	______	-110 to -100 dBm
	Band 5	-90 dBm	______	-100 to -90 dBm
4-16	Residual Responses			
	Band 1	-90 dBm	______	-115 to -90 dBm
	Band 2	-90 dBm	______	-120 to -90 dBm
	Band 3	-90 dBm	______	-115 to -90 dBm
	Band 4	-90 dBm	______	-110 to -90 dBm
	Band 5	-90 dBm	______	-100 to -90 dBm

Data Sheet

757 Spectrum Analyzer Serial Number ____________________

Paragraph No.	Function Tested	Nominal Value	Measured Value	Performance Limits
4-17	Frequency Accuracy			
	Band 1 LO	100 MHz	______	94 - 106 MHz
	MID	1000 MHz	______	994 - 1006 MHz
	HI	2000 MHz	______	1992 - 2008 MHz
	Band 2 LO	1800 MHz	______	1796 - 1804 MHz
	MID	3000 MHz	______	2994 - 3006 MHz
	HI	4000 MHz	______	3992 - 4008 MHz
	Band 3 LO	3300 MHz	______	3293 - 3307 MHz
	MID	5800 MHz	______	5788 - 5812 MHz
	HI	8300 MHz	______	8283 - 8317 MHz
	Band 4 LO	5400 MHz	______	5389 - 5411 MHz
	MID	8900 MHz	______	8882 - 8918 MHz
	HI	12400 MHz	______	12375 - 12425 MHz
	Band 5 LO	10000 MHz	______	9980 - 10020 MHz
	MID	16000 MHz	______	15968 - 16032 MHz
	HI	20000 MHz	______	19960 - 30040 MHz
4-18	Scan Width Accuracy	1000 MHz (100 MHz/Div)	______	±100 MHz
		2000 MHz (200 MHz/Div)	______	±200 MHz

Data Sheet

757 Spectrum Analyzer Serial Number________________

Paragraph No.	Function Tested	Nominal Value	Measured Value	Performance Limits
4-18 (Cont)	Scan Width Accuracy (Cont)	5000 MHz (500 MHz/Div)	______	±500 MHz
		7000 MHz (700 MHz/Div)	______	±700 MHz
		300 MHz (30 MHz/Div)	______	±30 MHz
		100 MHz (10 MHz/Div)	______	±10 MHz
		30 MHz (3 MHz/Div)	______	±3 MHz
		10 MHz (1 MHz/Div)	______	±1 MHz
		3000 kHz (300 kHz/Div)	______	±300 kHz
		1000 kHz (100 kHz/Div)	______	±100 kHz
		300 kHz (30 kHz/Div)	______	±30 kHz
		100 kHz (10 kHz/Div)	______	±10 kHz
		30 kHz (3 kHz/Div)	______	±3 kHz
		10 kHz (1 kHz/Div)	______	±1 kHz
4-19	Frequency Response			
	Band 1 1 - 100 MHz	2 dB peak to peak	______	3 dB peak to peak
	100 - 2000 MHz	2 dB peak to peak	______	3 dB peak to peak

Data Sheet

757 Spectrum Analyzer Serial Number ____________

Paragraph No.	Function Tested	Nominal Value	Measured Value	Performance Limits
4-19 (Cont)	Frequency Response (Cont)			
	Band 2 1.8 - 4.0 GHz	3 dB peak to peak	________	4 dB peak to peak
	Band 3 3.3 - 8.3 GHz	4 dB peak to peak	________	5 dB peak to peak
	Band 4 5.4 - 12.4 GHz	5 dB peak to peak	________	5 dB peak to peak
	Band 5 10 - 18 GHz	6 dB peak to peak	________	6 dB peak to peak
	18 - 22 GHz	6 dB peak to peak	________	6 dB peak to peak
4-20	IF Bandwidth Accuracy	1500 kHz	________	1200 to 1800 kHz
	Units with serial numbers above 700	1000 kHz	________	850 to 1150 kHz
		100 kHz	________	90 to 110 kHz
		10 kHz	________	9 to 11 kHz
		1.3 kHz	________	1 to 1.6 kHz
4-21	Scan Time Accuracy	0.01 msec	________	0.009 to 0.011 msec
		0.01 msec	________	0.09 - 0.11 msec
		1 msec	________	0.9 to 1.1 msec
		3 msec	________	2.7 to 3.3 msec
		10 msec	________	9 to 11 msec
		30 msec	________	27 to 33 msec
		100 msec	________	90 to 110 msec
		300 msec	________	270 to 330 msec
		1 sec	________	0.8 to 1.2 sec
		3 sec	________	2.4 to 3.6 sec
		10 sec	________	8 to 12 sec

Data Sheet

757 Spectrum Analyzer Serial Number ______________

Paragraph No.	Function Tested	Nominal Value	Measured Value	Performance Limits
4-22	Noise Sideband			
	30 kHz Separation	75 dB down	______	>70 dB down
	90 kHz Separation	85 dB down	______	>80 dB down
	300 kHz Separation	95 dB down	______	>90 dB down
	1000 kHz Separation	100 dB down	______	>95 dB down
4-23	Residual FM	100 Hz	______	<200 Hz

SECTION 5

FUNCTIONAL DESCRIPTION

5-1. INTRODUCTION

5-2. This section contains a functional description of the AILTECH 757 Spectrum Analyzer. The functional description consists of a simplified block diagram description, a detailed block diagram description, and a description of signals.

5-3. OVERALL BLOCK DIAGRAM DESCRIPTION

5-4. The AILTECH 757 Spectrum Analyzer consists of a superheterodyne receiver and a calibrated CRT display (see Figure 5-1). The receiver can be manually tuned to a fixed frequency or swept through a selected frequency interval.

5-5. RF SECTION. The RF input signal is first processed through the RF attentuator. The RF attentuator provides 60 dB of attenuation in 10 dB steps. It is used to reduce signal levels so that spurious signal generation within the Spectrum Analyzer is minimized. The signal at the output of the RF attenuator should not exceed -10 dBm. For maximum sensitivity the RF attenuator should be set to the 0 dB position. Immediately following the RF attenuator is a series of RF switches. If the low band,.1 MHz to 2 GHz is selected, the signal is mixed by the low band mixer with the output of the Yig oscillator phase and is converted to 2287 MHz. The Yig Preselector is fixed-tuned to this frequency in the low frequency band. Therefore, in order to derive an IF of 227 MHz the signal must be mixed with 2060 MHz. If any other RF range is selected, the input signal will be applied directly into the Yig preselector and will be mixed with the output of the swept Yig oscillator by the high-band harmonic mixer.

5-6. SWEEP GENERATOR. The sweep generator provides a horizontal deflection signal for the CRT and the tuning voltages for the Yig oscillator and Yig preselector. The inherent linearity of the Yig preselector and Yig oscillator ensure that the frequency tuning is linear with respect to horizontal deflection on the CRT. This same linearity also

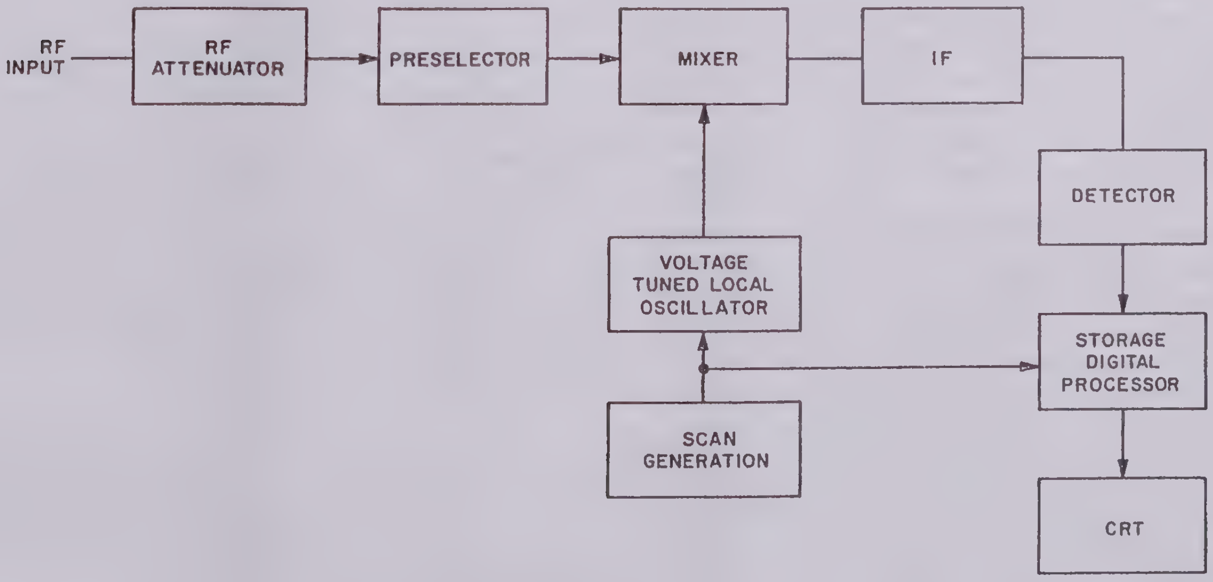


Figure 5-1. AILTECH 757 Spectrum Analyzer Simplified Block Diagram

ensures that the Yig preselector frequency is maintained at a fixed interval from the Yig oscillator frequency. The fixed interval is 227 MHz, the first IF. When the signal is passed through the Yig preselector, it is mixed with the output of the 248 MHz LCVCO oscillator by the second mixer to provide an output of 21.4 MHz at the intermediate frequency. The signal is then amplified, detected, and applied to the vertical deflection plates of the CRT. Since the horizontal deflection is proportional to frequency, the display is a plot of amplitude versus frequency of the applied incoming signal.

5-7. YIG PRESELECTOR. The Yig preselector is a three-sphere Yig filter capable of being electronically tuned from 1.8 GHz to in excess of 22 GHz. Offset and sweep logic circuits ensure that the center frequency of the Yig oscillator is always 227 MHz greater than the frequency of the Yig preselector.

5-8. The purpose of the Yig preselector is to prevent the generation of on-screen image signals without having to resort to microwave intermediate frequencies or to a large number of narrow bands.

5-9. YIG OSCILLATOR. The Yig oscillator is capable of being tuned electronically from 1.75 to 4.5 GHz. When the SCAN WIDTH/DIV switch is set in the MHz position, the local oscillator is swept over the selected scan width. When the SCAN WIDTH/DIV switch is in the kHz position, the oscillator is automatically stabilized and operates at a fixed frequency. Scanning is then performed by the 248 MHz LCVCO oscillator. After a down conversion, the signal is amplified and applied to the second mixer. This mixer is driven by the 248 MHz LCVCO oscillator and provides an output of 21.4 MHz for the signal processor. When the SCAN WIDTH/DIV switch is in the MHz position, the 248 MHz oscillator operates at a fixed frequency.

5-10. SIGNAL PROCESSOR. The signal processor consists of an IF processor, IF filters, and an IF attenuator. The IF attenuator is used to adjust the amplitude of the display and consists of two sections; one providing 100 dB in 10 dB steps and the other providing 10 dB in 1 dB steps. Four standard IF bandwidths are provided. These are determined by the four sets of filter banks which are selectable from the front panel. The AILTECH 757 Spectrum Analyzer utilizes harmonic mixing to obtain operation at higher RF frequency ranges (3.3 to 22 GHz). The automatic gain compensation senses the RF range of the Analyzer and inserts or removes attenuation as required in order to maintain a constant gain versus frequency.

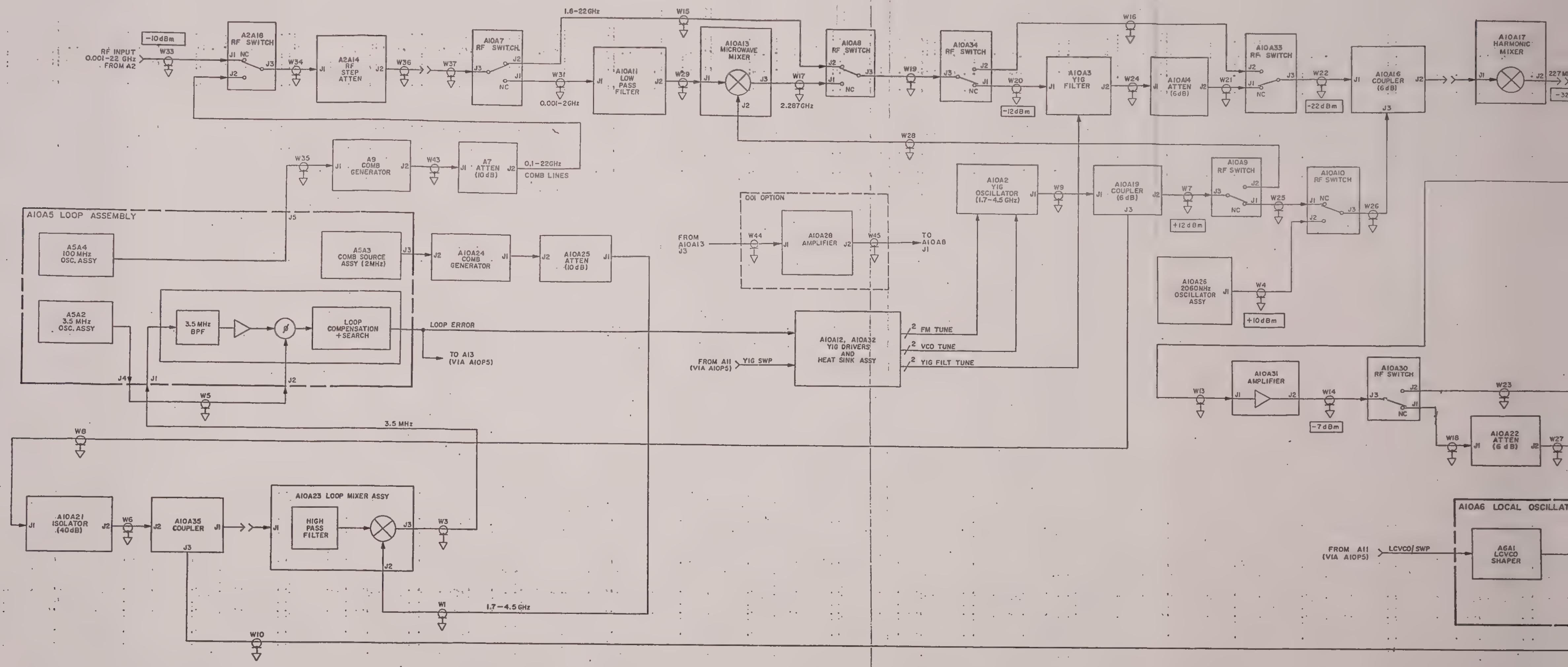
5-11. Signal amplitudes are usually measured in logarithmic units. Because of this, the final IF amplification is provided by a wide range 21.4 MHz log amplifier. This amplifier employes the successive limiting technique and converts linear IF to logarithmic video. The conversion is such that the amplifier response is within ±2 dB over the full 100 dB dynamic range of the instrument. If the amplitude range switch on the front panel is set to one of the log positions, the output of the 21.4 MHz IF log amplifier is applied directly to the video amplifier. However, some measurements are more convenient with a linear type display. If the amplitude range switch were placed in the linear position, the signal would be passed through a linear shaping amplifier that restores linear amplitude to the response. Additional filtering is provided in the video amplifier. The signals can then be further amplified before being applied to the vertifical deflection plates of the CRT.

5-12. DETAILED BLOCK DIAGRAM DESCRIPTION

5-13. RF SECTION. (See Figure 5-2.) When RF signal is applied to the precision RF INPUT cable J6, it is either processed or not, depending on the position of RF switch 1A2A18.

5-14. RF Switch 1A2A18 is activated by depressing the CALIBRATE button on the front panel. The RF switch moves to the open position and the 100 MHz Oscillator 1A10A5A4 is turned on. The oscillator supplies the fundamental frequency drive for Comb Generator 1A9. The output of Comb Generator 1A9 is all the 100 MHz multiples from 100 MHz to in excess of 22 GHz. These signals pass through a 10 dB Attenuator 1A7, which is used for matching and isolating, and into RF Switch 1A2A18. When the switch is in the closed position, the RF input, as opposed to the internal calibrate signal, will be processed into the 60 dB RF Step Attenuator 1A2A14.

5-15. RF Step Attenuator 1A2A14 is adjusted from the front panel in 10 dB increments from 0 to 60 dB. The RF attenuator reduces the amplitude of the incoming signal, preventing damage to any of the analyzer's components.


RF INPUT 0.001-22 GHz FROM A2
-10dBm
W33
A2A18 RF SWITCH
J1 NC J3 J2
W34
A2A14 RF STEP ATTEN
W36
W37
A10A7 RF SWITCH
1.8-22GHz
0.001-2GHz
W31
A10A11 LOW PASS FILTER
W15
W29
A10A13 MICROWAVE MIXER
W17
2.287GHz
A10A8 RF SWITCH
W19
A10A34 RF SWITCH
W20
-12dBm
A10A3 YIG FILTER
W24
A10A14 ATTEN (6dB)
W21
W16
A10A33 RF SWITCH
W22
-22dBm
A10A16 COUPLER (6dB)
A10A17 HARMONIC MIXER
227M
-32
W28
W35
A9 COMB GENERATOR
W43
A7 ATTEN (10dB)
0.1-22GHz
COMB LINES
A10A5 LOOP ASSEMBLY
A5A4 100MHz OSC. ASSY
A5A3 COMB SOURCE ASSY (2MHz)
A10A24 COMB GENERATOR
A10A25 ATTEN (10dB)
A5A2 3.5 MHz OSC. ASSY
3.5 MHz BPF
LOOP COMPENSATION +SEARCH
LOOP ERROR
TO A13 (VIA A10P5)
J4 J1 J2 J5
W5
3.5 MHz
001 OPTION
FROM A10A13 J3
W44
A10A28 AMPLIFIER
W45
TO A10A8 J1
A10A2 YIG OSCILLATOR (1.7-4.5 GHz)
W9
A10A19 COUPLER (6dB)
W7
+12dBm
A10A9 RF SWITCH
W25
A10A10 RF SWITCH
W26
A10A26 2060MHz OSCILLATOR ASSY
W4
+10dBm
A10A12, A10A32 YIG DRIVERS AND HEAT SINK ASSY
FROM A11 (VIA A10P5)
YIG SWP
2 FM TUNE
2 VCO TUNE
2 YIG FILT TUNE
W13
A10A31 AMPLIFIER
W14
-7dBm
A10A30 RF SWITCH
W23
W18
A10A22 ATTEN (6dB)
W27
W8
A10A21 ISOLATOR (40dB)
W6
A10A35 COUPLER
A10A23 LOOP MIXER ASSY
HIGH PASS FILTER
W3
W1
1.7-4.5 GHz
W10
A10A6 LOCAL OSCILLAT
FROM A11 (VIA A10P5)
LCVCO/SWP
A6A1 LCVCO SHAPER

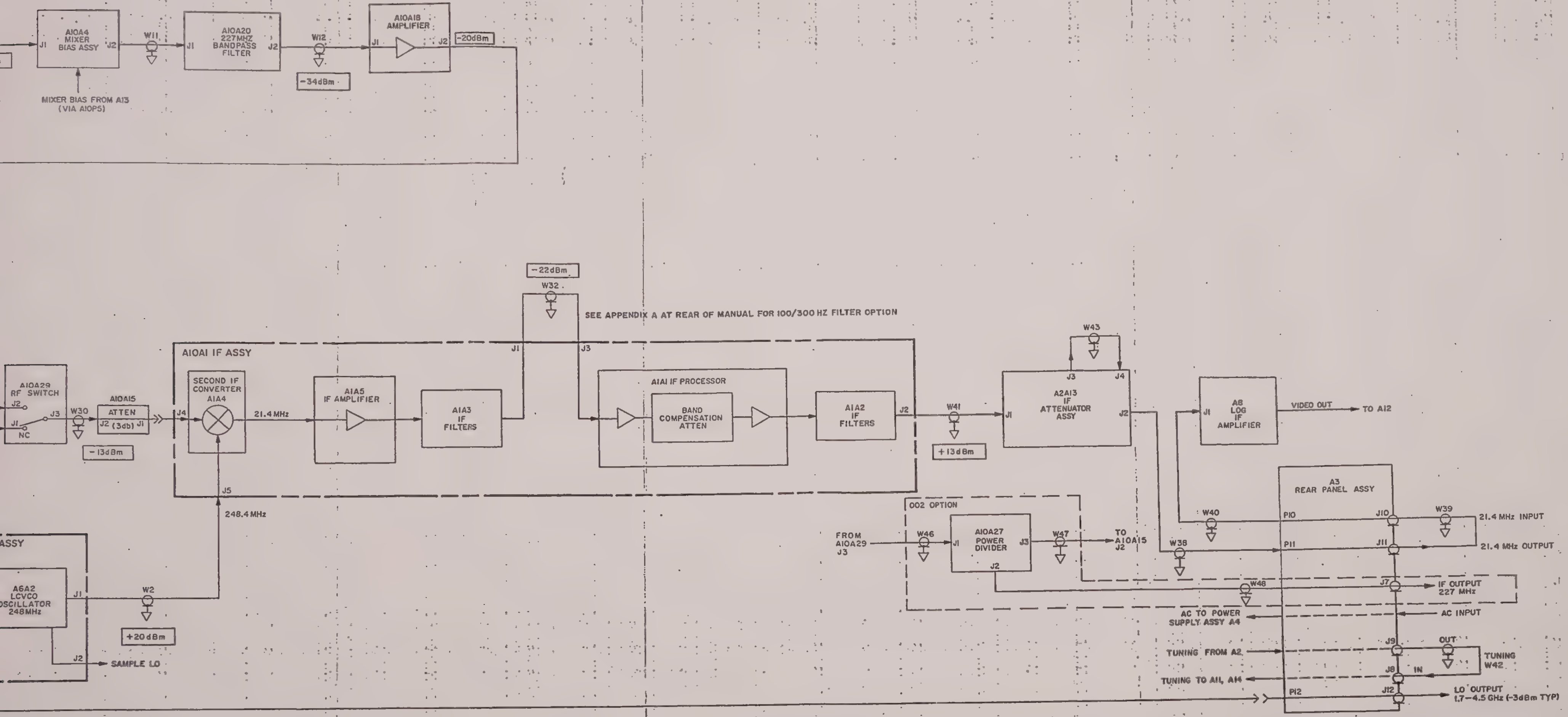

A10A4 MIXER BIAS ASSY
J1
J2
W11
A10A20 227MHZ BANDPASS FILTER
W12
-34dBm
A10A18 AMPLIFIER
-20dBm
MIXER BIAS FROM A13 (VIA A10P5)
-22dBm
W32
SEE APPENDIX A AT REAR OF MANUAL FOR 100/300 HZ FILTER OPTION
A10A1 IF ASSY
J3
J4
J5
A10A29 RF SWITCH
NC
W30
A10A15 ATTEN
J2 (3db) J1
-13dBm
SECOND IF CONVERTER A1A4
21.4 MHz
A1A5 IF AMPLIFIER
A1A3 IF FILTERS
A1A1 IF PROCESSOR
BAND COMPENSATION ATTEN
A1A2 IF FILTERS
W41
+13dBm
W43
A2A13 IF ATTENUATOR ASSY
A8 LOG IF AMPLIFIER
VIDEO OUT
TO A12
248.4 MHz
ASSY
A6A2 LCVCO OSCILLATOR 248MHz
W2
+20dBm
SAMPLE LO
002 OPTION
FROM A10A29 J3
W46
A10A27 POWER DIVIDER
W47
TO A10A15 J2
W38
W40
W48
A3 REAR PANEL ASSY
P10
P11
P12
J7
J8
J9
J10
J11
J12
W39
21.4 MHz INPUT
21.4 MHz OUTPUT
IF OUTPUT 227 MHz
AC TO POWER SUPPLY ASSY A4
AC INPUT
TUNING FROM A2
TUNING TO A11, A14
OUT
IN
TUNING W42
LO OUTPUT 1.7—4.5 GHz (-3dBm TYP)

Figure 5-2. AILTECH 757 Spectrum Analyzer Detailed Block Diagram (Sheet 1 of 2)

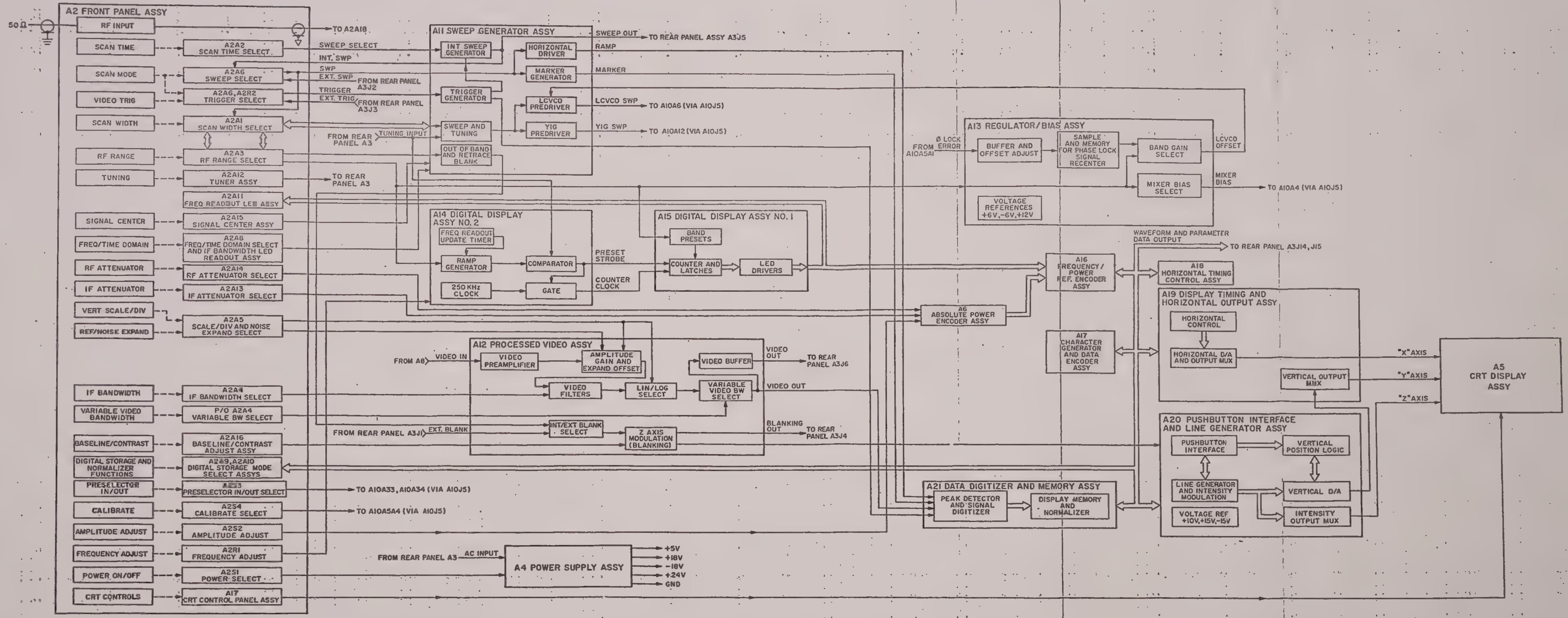

A2 FRONT PANEL ASSY
50Ω
RF INPUT
TO A2A18
SCAN TIME
A2A2 SCAN TIME SELECT
SCAN MODE
A2A6 SWEEP SELECT
VIDEO TRIG
A2A6, A2R2 TRIGGER SELECT
SCAN WIDTH
A2A1 SCAN WIDTH SELECT
RF RANGE
A2A3 RF RANGE SELECT
TUNING
A2A12 TUNER ASSY
A2A11 FREQ READOUT LED ASSY
SIGNAL CENTER
A2A15 SIGNAL CENTER ASSY
FREQ/TIME DOMAIN
A2A8 FREQ/TIME DOMAIN SELECT AND IF BANDWIDTH LED READOUT ASSY
RF ATTENUATOR
A2A14 RF ATTENUATOR SELECT
IF ATTENUATOR
A2A13 IF ATTENUATOR SELECT
VERT SCALE/DIV
REF/NOISE EXPAND
A2A5 SCALE/DIV AND NOISE EXPAND SELECT
IF BANDWIDTH
A2A4 IF BANDWIDTH SELECT
VARIABLE VIDEO BANDWIDTH
P/O A2A4 VARIABLE BW SELECT
BASELINE/CONTRAST
A2A16 BASELINE/CONTRAST ADJUST ASSY
DIGITAL STORAGE AND NORMALIZER FUNCTIONS
A2A9, A2A10 DIGITAL STORAGE MODE SELECT ASSYS
PRESELECTOR IN/OUT
A2S3 PRESELECTOR IN/OUT SELECT
TO A10A33, A10A34 (VIA A10J5)
CALIBRATE
A2S4 CALIBRATE SELECT
TO A10A5A4 (VIA A10J5)
AMPLITUDE ADJUST
A2S2 AMPLITUDE ADJUST
FREQUENCY ADJUST
A2R1 FREQUENCY ADJUST
POWER ON/OFF
A2S1 POWER SELECT
CRT CONTROLS
A17 CRT CONTROL PANEL ASSY
SWEEP SELECT
INT. SWP
SWP
EXT. SWP
FROM REAR PANEL A3J2
TRIGGER
EXT. TRIG
FROM REAR PANEL A3J3
FROM REAR PANEL A3
TUNING INPUT
TO REAR PANEL A3
A11 SWEEP GENERATOR ASSY
INT SWEEP GENERATOR
HORIZONTAL DRIVER
MARKER GENERATOR
TRIGGER GENERATOR
LCVCO PREDRIVER
SWEEP AND TUNING
YIG PREDRIVER
OUT OF BAND AND RETRACE BLANK
SWEEP OUT
TO REAR PANEL ASSY A3J5
RAMP
MARKER
LCVCO SWP
TO A10A6 (VIA A10J5)
YIG SWP
TO A10A12 (VIA A10J5)
A13 REGULATOR/BIAS ASSY
FROM A10A5A1
Ø LOCK ERROR
BUFFER AND OFFSET ADJUST
SAMPLE AND MEMORY FOR PHASE LOCK SIGNAL RECENTER
BAND GAIN SELECT
LCVCO OFFSET
MIXER BIAS SELECT
MIXER BIAS
TO A10A4 (VIA A10J5)
VOLTAGE REFERENCES +6V, -6V, +12V
A14 DIGITAL DISPLAY ASSY NO. 2
FREQ READOUT UPDATE TIMER
RAMP GENERATOR
COMPARATOR
250 KHz CLOCK
GATE
PRESET STROBE
COUNTER CLOCK
A15 DIGITAL DISPLAY ASSY NO. 1
BAND PRESETS
COUNTER AND LATCHES
LED DRIVERS
WAVEFORM AND PARAMETER DATA OUTPUT
TO REAR PANEL A3J14, J15
A16 FREQUENCY/POWER REF. ENCODER ASSY
A18 HORIZONTAL TIMING CONTROL ASSY
A6 ABSOLUTE POWER ENCODER ASSY
A19 DISPLAY TIMING AND HORIZONTAL OUTPUT ASSY
HORIZONTAL CONTROL
HORIZONTAL D/A AND OUTPUT MUX
VERTICAL OUTPUT MUX
"X" AXIS
"Y" AXIS
"Z" AXIS
A5 CRT DISPLAY ASSY
A17 CHARACTER GENERATOR AND DATA ENCODER ASSY
A12 PROCESSED VIDEO ASSY
FROM A8
VIDEO IN
VIDEO PREAMPLIFIER
AMPLITUDE GAIN AND EXPAND OFFSET
VIDEO BUFFER
VIDEO OUT
TO REAR PANEL A3J6
VIDEO FILTERS
LIN/LOG SELECT
VARIABLE VIDEO BW SELECT
VIDEO OUT
FROM REAR PANEL A3J1
EXT. BLANK
INT/EXT BLANK SELECT
Z AXIS MODULATION (BLANKING)
BLANKING OUT
TO REAR PANEL A3J4
A20 PUSHBUTTON INTERFACE AND LINE GENERATOR ASSY
PUSHBUTTON INTERFACE
VERTICAL POSITION LOGIC
LINE GENERATOR AND INTENSITY MODULATION
VERTICAL D/A
VOLTAGE REF +10V, +15V, -15V
INTENSITY OUTPUT MUX
A21 DATA DIGITIZER AND MEMORY ASSY
PEAK DETECTOR AND SIGNAL DIGITIZER
DISPLAY MEMORY AND NORMALIZER
FROM REAR PANEL A3
AC INPUT
A4 POWER SUPPLY ASSY
+5V
+18V
-18V
+24V
GND

Figure 5-2. AILTECH 757 Spectrum Analyzer Detailed Block Diagram (Sheet 2 of 2)

5-16. The output of the RF attenuator is then fed into RF Switch 1A10A7 which is ganged with RF Switch 1A10A8. When the RF range of the 757 Spectrum Analyzer is set to .001–2 GHz (band 1), the switches are in the closed position. The RF signal is passed through a 2 GHz Low Pass Filter 1A10A11 and into a Microwave Mixer 1A10A13. The signals are then up-converted in conjunction with the swept LO signal from Yig Oscillator 1A10A2. When the RF Switches 1A10A7 and 1A10A8 are activated (bands 2–5), the RF input signal bypasses the low frequency conversion and is fed into the Yig Filter 1A10A3 via RF Switch 1A10A34.

5-17. When the 757 Spectrum Analyzer is set to 1.8–22 GHz (bands 2–5), the Yig filter is swept and positioned one IF (227 MHz) below the Yig Oscillator 1A10A2. When the analyzer is set to .001 –2 GHz (band 1), the Yig Filter 1A10A3 becomes fixed-tuned to 2287 MHz. The mixing product of the RF input and the swept LO must result in a product of 2287 MHz for conversion to take place. The signal is then passed through Attenuator 1A10A14 and RF Switch 1A10A33. It should be noted that RF Switches 1A10A34 and 1A10A33 are ganged, providing a bypass path which removes Yig Filter 1A10A3 and 6 dB Attenuator 1A10A14 from the signal path. The two RF switches are controlled by the PRESELECTOR IN-OUT switch. This increases the system sensitivity by the insertion loss of the filter/attenuator combination.

5-18. After the incoming signal is passed through RF Switch 1A10A33, it goes into Directional Coupler 1A10A16. As a function of the positions of RF Switches 1A10A9 and 1A10A10, the coupler combines either the swept LO from Yig Oscillator 1A10A2 (bands 2–5) or a fixed LO at 2060 MHz (band 1). The combined signals are then applied to Harmonic Mixer 1A10A17 which produces the first IF conversion to 227 MHz.

5-19. Coupler 1A10A19 directs the output of Yig Oscillator 1A10A2 to Isolator 1A10A21 and Coupler 1A10A35. Coupler 1A10A35 sends the coupled down LO to the Rear Panel Connector P12 (LO OUTPUT) for use with accessory equipment or for making accurate frequency measurements.

5-20. The output of Coupler 1A10A35 is connected to Loop Mixer Assembly 1A10A23 and is used to phase lock the Yig oscillator. The phase lock circuit is energized when the SCAN WIDTH/DIV switch is in KHZ PHASE LOCKED positions (1 KHz to 300 KHz). This locks Yig Oscillator 1A10A2 to an internal 3.5 MHz crystal reference oscillator. Drift in the Yig oscillator is detected by the phase detector and compensated for. Phase locking occurs only when the SCAN WIDTH/DIV switch is lower than 1 MHz on the scale. When the SCAN WIDTH/DIV switch is in the phase lock mode, the Yig oscillator sweep is disabled and a second sweep is begun on the 248 MHz LCVCO oscillator, which is included in the 1A10A6 Assembly. The Yig oscillator is phase locked by mixing its coupled-down output with a crystal controlled comb source that is generated in Loop Assembly 1A10A5 and processed through Comb Generator 1A10A24 and Attenuator 1A10A25. The output of Attenuator 1A10A25 is connected to Loop Mixer Assembly 1A10A23. These comb lines, which are 2 MHz apart between 1.7 GHz and 4.5 GHz, are the reference for the stabilization of the Yig Oscillator 1A10A2.

5-21. The output of Mixer/Filter Assembly 1A10A23 is a 3.5 MHz IF signal. This 3.5 MHz signal is processed through a narrow 3.5 MHz bandpass filter, amplified, and combined with another 3.5 MHz signal that is generated by Crystal Oscillator 1A10A5A2. Both signals are phase detected and fed into a loop compensation and 8 Hz Oscillator Network 1A10A5A1. The output of this network is the loop error, processed through the Yig Drivers 1A10A12 which now forms a closed loop. Any drift in the Yig Oscillator 1A10A2 is detected by the phase detector and compensated for. When the SCAN WIDTH/DIV switch is in the phase locked mode, the 248 MHz LCVCO Oscillator 1A10A6 is swept to achieve narrow scan widths. When the loop is closed, an automatic recentering circuit (P/O 1A13) is energized, to offset the LCVCO oscillator equal and opposite to the induced frequency error of the Yig oscillator. This forces the signal to lock in the center of the screen. In the nonphase locked mode, the LCVCO oscillator is fixed-tuned and resonates at 248 MHz.

5-22. IF SECTION. The 227 MHz first IF generated in Harmonic Mixer 1A10A17 is processed through Mixer Bias Assembly 1A10A4. This unit optimizes the mixing for all harmonics so that frequencies up to 22 GHz can be achieved by the 757 Spectrum Analyzer. When the RF range (GHz) switch is set to bands 1 or 2 (.001–4 GHz), the Yig oscillator is used in the fundamental mixing mode. Band 3 (3.3–8.3 GHz) uses the second harmonic, band 4 (5.4–12.4 GHz) the third harmonic and band 5 (10–22 GHz) the fifth harmonic of the Yig oscillator to generate the required microwave frequencies.

5-23. The broadband 227 MHz output of the mixer bias is applied to a 227 MHz bandpass filter which has a 10 MHz 3 dB bandwidth and narrows the 227 MHz accordingly. The 227 MHz signal is then amplified in RF Amplifiers 1A10A18 and 1A10A31. In bands 1–4, RF Switches 1A10A30 and 1A10A29 are in the closed position so that Attenuator 1A10A22 reduces the IF gain by 6 dB. In band 5 the switches close, thus passing the maximum IF signal.

5-24. The 227 MHz IF is then combined in IF Assembly 1A10A1 with the 248 MHz LO from 1A10A6 to produce a 21.4 MHz second IF. Mixing occurs in the Second IF Converter 1A10A1A4. The 21.4 MHz output is amplified and processed into the 1A10A1A3 Filter bank. The filter bank consists of four IF filters 1 MHz, 100 KHz, 10 KHz, 1 KHz which are selected automatically or manually from the front panel. In the automatic position, a matrix is generated as a function of the SCAN WIDTH/ DIV, SCAN TIME/DIV, and IF BANDWIDTH (KHz) switches so that the Analyzer will always select the narrowest filter bandwidth possible. If an incorrect (too narrow) IF bandwidth is manually selected, a normal loss of amplitude will occur. This is corrected by either reducing the SCAN TIME/DIV or SCAN WIDTH/DIV switches until the UNCAL LED is extinguished.

5-25. The output of the first filter bank (21.4 MHz OUTPUT) connects to the IF Processor 1A10A1A1. The processor adjusts the IF gain of the system as a function of filter bandwidth and system RF band to band gain or loss. The 21.4 MHz IF is filtered again in the second IF filter bank which has been cascaded with the first filter bank. The output of the IF Assembly 1A10A1 is then fed into the IF Attenuator 1A2A13. The IF attenuator provides 110 dB in 1 dB steps allowing the operator to adjust the signal amplitude on the CRT with respect to the noise level of the signal. The output of the IF Attenuator 1A2A13 is connected to the Rear Panel Assembly 1A3-J11 and is then jumped on the rear panel externally before it comes back into the system on 1A3-J10. This allows the user to monitor the 21.4 MHz IF via a 3 dB hybrid. The 21.4 MHz IF is then fed into the Log IF Amplifier 1A8. The Log IF Amplifier provides a better than 100 dB dynamic range and converts the 21.4 MHz IF into a video format for system processing.

5-26. FRONT PANEL ASSEMBLY 1A2. The following paragraphs provide a description of front panel controls and components.

5-27. SCAN TIME/DIV Switch. This 11 position switch allows the operator to choose the rate at which the Analyzer is swept. Sweep rate, whose time is set by an RC circuit on the switch, provides the sweep time for the Yig oscillator, Yig filter, and second local oscillator. The time constant works in conjunction with Sweep Generator 1A11 and divides the ramp formed into ten equal time periods.

5-28. SCAN MODE Switch. This 7 position switch selects the trigger mode for internal scan or for an external sweep or trigger. The VIDEO TRIG threshold level control operates only when the SCAN MODE switch is set to the VIDEO position.

5-29. SCAN WIDTH/DIV Switch. This 14 position switch selects calibrated scan widths from 1 kHz to 700 MHz per division. The SCAN WIDTH/ DIV switch consists of a series of precision voltage dividers that set the sweep amplitude for the Yig oscillator, Yig filter, and second local oscillator sweeps generated on Sweep Generator 1A11.

5-30. TUNING. The TUNING control provides a dc offset ±6 vdc to the sweeps that drive the Yig devices. The tuning line is routed through the Rear Panel Assembly 1A3 to allow the operator access to the tuning line for remote tuning of the Spectrum Analyzer.

5-31. SIGNAL CENTER Assembly 1A2A15. This assembly provides the vernier control of the tracking between Yig filter and oscillator. The input signal is maximized in amplitude by adjusting this control. The SIGNAL CENTER control, when depressed at SCAN WIDTH/DIV of 300 kHz or less, causes the displayed RF signal to skip to the next internally generated comb line. It is possible to skip the oscillator to an adjacent comb line only in bands 1–4 due to the harmonics of the Yig oscillator being used. The skipping action is a user convenience, rarely required.

5-32. FREQ/TIME DOMAIN Switch 1A2A8. This switch allows the Spectrum Analyzer to be used in both the frequency and time domains. When in the frequency domain, the horizontal axis is calibrated in frequency intervals. Operating in the time domain allows the operator to look at a fixed frequency. When the DOMAIN switch is set to TIME, the unit stops sweeping and looks at the envelope of the displayed RF in the time domain. If sine wave modulation is present, the Spectrum Analyzer can be used as an oscilloscope to determine the time interval of the modulation. The Analyzer then is not viewing the carrier frequency but the detected frequency.

5-33. RF Attenuator 1A2A14. The RF ATTEN (dB) control is a 60 dB drum step attenuator that operates on the input signal only. It is capable of taking 2 watts of power when set to 20 dB or more and 100 mw in the straight through or 0 dB position. This control's main function is to prevent overloading of the Spectrum Analyzer from high powered RF signals.

5-34. IF Attenuator 1A2A13. The IF ATTEN (dB) control is a two drum 110 dB attenuator that operates on 21.4 MHz. Its function is to give the operator control over the signal and noise so that it can be placed in a convenient position on the CRT.

5-35. Vertical Scale. The VERT SCALE/DIV switch allows the operator to select three logarithmic amplitude display sensitivities or a linear display. The switch includes a concentric, two position switch that allows the user to expand around either the noise or the ref level. When in the REF mode, as we reduce to below 10 dB/div, the signal stays at the top of the CRT and the noise expands downward. This mode is used when there is a signal of large amplitude present. When a signal is of small amplitude we would expand about the noise. As the amplitude is reduced below 10 dB/div, the noise floor and signal move up and it may be necessary to add IF attenuation to conveniently center the signal. In this mode the REF level alphanumeric readout is blanked to prevent the user making an error in determining the absolute power of this signal.

5-36. Frequency Readout LED Assembly 1A2A11. The frequency readout LED assembly consists of five 7 segment LEDs which display the center frequency of the Spectrum Analyzer.

5-37. IF BANDWIDTH Switch. The IF BANDWIDTH (KHz) switch is a 5 position switch which allows automatic or manual selection of one of the four IF filters in the system. This switch includes a concentric switch that allows the user to manually select variable video filtering between 1 MHz and 10 Hz. When in the extreme clockwise position, the Analyzer will automatically select the correct IF and video bandwidth for the settings of the SCAN WIDTH/DIV and SCAN TIME/DIV switches. The function of the video filters is to provide smoothing of the video signal. Too much video filtering will distort the signal. Therefore, when the variable video filter is energized, UNCAL illuminates to warn the user that the display may be uncalibrated.

5-38. BASELINE/CONTRAST Control. When the Spectrum Analyzer is in the bypass mode, this control is energized to clip the noise so that it does not interfere with the data taken from the signal of interest. This is primarily used for photography. The contrast control allows the noise to be viewed at a lower intensity to prevent blooming when a photograph is taken.

5-39. SWEEP GENERATOR ASSEMBLY 1A11. The sweep generator consists of eight major circuits. This board generates the main and associated sweeps for the system as well as the tuning marker and required out of band blanking.

5-40. PROCESSED VIDEO ASSEMBLY 1A12. The processed video assembly gives the video gain and offset for the system. In addition, it provides the video filtering and Z axis blanking for the BASELINE/CONTRAST control.

5-41. REGULATOR/BIAS ASSEMBLY 1A13. The regulator/bias board takes the phase lock error signal, buffers it, and feeds it into a sample and hold circuit. This process is used for repositioning the signal into the center of the screen. The board provides the dc voltage for the mixer bias select circuit. This circuit consists of a number of potentiometers which adjust the mixer for the associated harmonics being used. The board also provides the regulated ±6 Vdc and the raw +12 Vdc and -6 Vdc for the system.

5-42. DIGITAL DISPLAY ASSEMBLY NO. 2 1A14. This board contains the circuitry to divide the 1 MHz clock to 250 kHz and to convert the analog tuning voltage to a digital word.

5-43. DIGITAL DISPLAY ASSEMBLY NO. 1 1A15. This board takes the outputs of Digital Display No. 2 and combines it with the band presets to convert the digital word into a number and provide driving and decoding for the LED and CRT displays.

5-44. FREQUENCY/POWER REFERENCE ENCODER ASSEMBLY 1A16. This board takes the outputs from Digital Display Assembly No. 1 and Absolute Power Encoder Assembly 1A6. The information is encoded and presented on the CRT display. In addition, the signals are buffered and brought to the rear panel for monitoring purposes.

5-45. CHARACTER GENERATOR AND DATA ENCODER ASSEMBLY 1A17. This board takes the inputs from the SCAN WIDTH/DIV, SCAN TIME/DIV, IF BANDWIDTH and VERT SCALE/DIV switches and encodes them for presentation on the display. The signals are also buffered and brought to the rear panel.

5-46. HORIZONTAL TIMING CONTROL ASSEMBLY 1A18. This board contains three counters that create the digital sweep for the representation of waveforms and character data on the screen. The board also accepts information from other printed circuit boards and determines whether the readout is enabled or disabled, or whether there is an A or B sweep, etc. The board also contains the oscillator that serves as the system clock, the character dot generator, Z axis dot driver and logic for combining the digital character sweeps with the analog waveform sweeps.

5-47. DISPLAY TIMING AND HORIZONTAL OUTPUT ASSEMBLY 1A19. The main function of this board is to convert the digital information from the Horizontal Timing Control Assembly Board 1A18 into an analog voltage. A multiplexer takes the horizontal and vertical outputs to the CRT. Depending on which mode the system is in, the board will either present digitally generated analog information or straight analog information. The board also contains the line generator timing logic which divides the 4 MHz clock down to 1 MHz and provides the circuitry for determining dot formation and position of characters for the CRT raster scan, and provides the 1 MHz clock for Digital Display Assembly No. 2 1A14.

5-48. PUSHBUTTON INTERFACE AND LINE GENERATOR ASSEMBLY 1A20. This board produces the line generating logic needed to connect the dots presented on the screen. The board contains two digital-to-analog converters required to generate lines, and the operational amplifiers necessary to modulate the Z axis for intensification. A Z axis multiplexer is included to present digital logic from one of three sources; intensity modulation from the line generator, intensity modulation from the dot generator, and intensity modulation of analog input signals. There is also a 10 Vdc regulator used on all the digital-to-analog converters and a PROM which directs the vertical position of the characters on the screen. This board contains the pushbutton debouncers for switch assemblies 1A2A9 and 1A2A10 on the front panel assembly. The logic that stores the required information when the pushbuttons are depressed is located on this board, as well as the guide logic for the indicator LEDs on the front panel. The control of the other boards, communicating which mode is enabled, is the job of the pushbutton interface board.

5-49. DATA DIGITIZER AND MEMORY ASSEMBLY 1A21. This board contains a RAM which stores all video information (A and B channels, recall, and input modes). It contains normalizer logic, which has the capability of subtracting two waveforms and presenting the data to the digital-to-analog circuits for representation on the screen. Also present are data buffers which go to the rear panel and present the user with data for his own use. Digital logic and analog signals are combined on this board to digitize data from the Spectrum Analyzer. In addition, there are buffer amplifiers, sample and hold circuits, peak detectors, and an analog-to-digital converter to digitize incoming analog video signals. There is also a mode for digitizing ramp waveform. The most significant circuit on this board is the timing logic for loading the memories and determining which mode the system is in.

5-50. SIGNAL DESCRIPTIONS

5-51. The following paragraphs contain descriptions of signals for the AILTECH 757 Spectrum Analyzer.

5-52. INPUT SIGNALS. Paragraphs 5-53 through 5-74 provide descriptions of the input signals for the AILTECH 757 Spectrum Analyzer.

5-53. Video Out. This signal is the analog realtime representation of the analyzer vertical output from the preamplifier board. The voltage of this signal varies between 0 Vdc and 1.5 Vdc.

5-54. Ramp. This signal is the analog realtime representation of the analyzer horizontal output from the sweep generator board. The voltage of the signal varies between 0 Vdc and 6 Vdc.

5-55. Internal Blanking. This signal is the blanking output from the preamplifier board. The voltage from this signal varies between 0 Vdc and 5 Vdc.

5-56. Horz Sync. This signal originates from the sweep generator board and has a TTL logic compatible output. The signal becomes active through a high to low transition at the beginning of every sweep.

5-57. Marker. This signal originates from the front panel and generates a notched waveform which is added to the video signal when a full range input is selected. The amplitude of the notch is approximately -120 mV.

5-58. AMPLX –, AMP2X –, AMP5X –, AMP10 –. These signals originate from the VERT SCALE/DIV switch on the front panel providing an active low signal (0 Vdc) and an open circuit when inactive. These signals represent a linear, 2 dB, 5 dB and 10 dB scale per division respectively. (Refer to Table 5-1.)

Table 5-1. Vertical Scale Inputs

	Vertical Scale Input			
Signal	Linear	2 dB	5 dB	10 dB
AMPLX –	0	1	1	1
AMP2X –	X	0	1	1
AMP5X –	X	X	0	1
AMP10 –	X	X	X	0
0 = 0 Vdc 1 = 5 Vdc				

5-59. I1X0X +, I1X1X +, I1X2X +, I1X3X +. These signals originate from the IF BANDWIDTH switch on the front panel. These signals are +18 Vdc when active, and -18 Vdc when inactive. They represent IF Bandwidth of 1 kHz, 10 kHz, 100 kHz, and 1 MHz, respectively. (Refer to Table 5-2.)

Table 5-2. IF Bandwidths Inputs

	IF Bandwidth Input			
Signal	1000 kHz	100 kHz	10 kHz	1 kHz
I1X0X +	1	0	0	0
I1X1X +	X	1	0	0
I1X2X +	X	X	1	0
I1X3X +	X	X	X	1
0 = -18 Vdc 1 = +18 Vdc				

5-60. Scan Width Signals. The scan width signals originate from the SCAN WIDTH/DIV switch on the front panel providing an active low (0 Vdc) and an open circuit when inactive. (Refer to Table 5-3.)

5-61. Scan Time Signals. The scan time signals originate from the SCAN TIME/DIV switch on the front panel providing an active low (0 Vdc) and open circuit when inactive. (Refer to Table 5-4.)

5-62. Frequency Signals. The frequency signals originate from the digital display board. All signals are active high TTL logic levels. The required signals represent five binary coded digits as well as four leading zero blanking signals for the least significant digits. These signals represent a center frequency from 0 MHz to 22 GHz. (Refer to Table 5-5.)

5-63. Reference Level Inputs. The reference level inputs originate from the absolute power board. All signals have TTL logic levels. Those signals that represent the two least significant digits are active high (Table 5-6); all other signals are active low (Table 5-7). These signals represent a range of reference level values from -40 to +160 dBm.

5-64. BYPAS +, BYPAS – (BYPASS Pushbutton). These pushbutton signals are 1 and 0 respectively when inactive. Upon activating the BYPASS pushbutton once, the controller will disengage the representation of a waveform by digital means and allow the original waveform to be represented. Upon activating the pushbutton again, the digital representation will again appear. The BYPASS and SIGNAL IN LEDs will be activated whenever the bypass mode is engaged. All other modes and LEDs will be disabled except for readout disable. The system will automatically engage the bypass mode when the scan time is less than 3 ms/division and the system is not in the manual scan mode.

Table 5-3. Scan Width Signals

Signal	Scan Width Input													
	1 kHz	3 kHz	10 kHz	30 kHz	100 kHz	300 kHz	1 MHz	3 MHz	10 MHz	30 MHz	100 MHz	200 MHz	500 MHz	700 MHz
SW1X3 –	0	1	1	1	1	1	1	1	1	1	1	1	1	1
SW3X3 –	X	0	1	1	1	1	1	1	1	1	1	1	1	1
SW1X4 –	X	X	0	1	1	1	1	1	1	1	1	1	1	1
SW3X4 –	X	X	X	0	1	1	1	1	1	1	1	1	1	1
SW1X5 –	X	X	X	X	0	1	1	1	1	1	1	1	1	1
SW3X5 –	X	X	X	X	X	0	1	1	1	1	1	1	1	1
SW1X6 –	X	X	X	X	X	X	0	1	1	1	1	1	1	1
SW3X6 –	X	X	X	X	X	X	X	0	1	1	1	1	1	1
SW1X7 –	X	X	X	X	X	X	X	X	0	1	1	1	1	1
SW3X7 –	X	X	X	X	X	X	X	X	X	0	1	1	1	1
SW1X8 –	X	X	X	X	X	X	X	X	X	X	0	1	1	1
SW2X8 –	X	X	X	X	X	X	X	X	X	X	X	0	1	1
SW5X8 –	X	X	X	X	X	X	X	X	X	X	X	X	0	1
SW7X8 –	X	X	X	X	X	X	X	X	X	X	X	X	X	0

0 = 0 Vdc
1 = 5 Vdc

Table 5-4. Scan Time Signals

Signal	Scan Time Input										
	10 sec	3 sec	1 sec	300 ms	100 ms	30 ms	10 ms	3 ms	1000 μs	100 μs	10 μs
ST100 –	0	1	1	1	1	1	1	1	1	1	1
ST3X0 –	X	0	1	1	1	1	1	1	1	1	1
ST1X0 –	X	X	0	1	1	1	1	1	1	1	1
ST3X1 –	X	X	X	0	1	1	1	1	1	1	1
ST1X1 –	X	X	X	X	0	1	1	1	1	1	1
ST3X2 –	X	X	X	X	X	0	1	1	1	1	1
ST1X2 –	X	X	X	X	X	X	0	1	1	1	1
ST3X3 –	X	X	X	X	X	X	X	0	1	1	1
ST1X3 –	X	X	X	X	X	X	X	X	0	1	1
ST1X4 –	X	X	X	X	X	X	X	X	X	0	1
ST1X5 –	X	X	X	X	X	X	X	X	X	X	0

0 = 0 Vdc
1 = 5 Vdc

Table 5-5. Frequency Signals

Signal	Center Frequency Digit Input										
	0	1	2	3	4	5	6	7	8	9	Blank
FRQ 11+	0	1	0	1	0	1	0	1	0	1	0
FRQ 12+	0	0	1	1	0	0	1	1	0	0	0
FRQ 14+	0	0	0	0	1	1	1	1	0	0	0
FRQ 18+	0	0	0	0	0	0	0	0	1	1	0
FRB K1–	1	1	1	1	1	1	1	1	1	1	0

0 = TTL Low
1 = TTL High

Coding for most significant digit of center frequency.
(Coding of remaining digits is similar execept for the least significant digit which has no blanking signal.)

Table 5-6. Reference Level Inputs (High)

Signal	Power Reference Digit Input									
	0	1	2	3	4	5	6	7	8	9
PRF 21+	0	1	0	1	0	1	0	1	0	1
PRF 22+	0	0	1	1	0	0	1	1	0	0
PRF 24+	0	0	0	0	1	1	1	1	0	0
PRF 28+	0	0	0	0	0	0	0	0	1	1

0 = TTL Low
1 = TTL High

Least significant digit of reference level
(The second least significant digit coding is similar.)

Table 5-7. Reference Level Inputs (Low)

Signal	Power Reference Sign & MSB Input							
	+1	+	+1	+	-1	-	1	
PRF 01 –	0	1	0	1	0	1	0	1
PRFM –	0	0	1	1	0	0	1	1
PRFP –	0	0	0	0	1	1	1	1

0 = TTL Low
1 = TTL High

Sign and most significant digit of reference level.

5-65. RD DIS +,RD DIS – (READOUT DISABLE PUSHBUTTON). These signals are 1 and 0 respectively when active, and 0 and 1 respectively when inactive. When activated, the alphanumeric parameter representation is blanked from the CRT. Upon activating the pushbutton again, the alphanumerics will again appear. Whenever readout disable is active, the READOUT DISABLE LED will be active. The parameter readout may be active at any scan time while in the non-bypass mode; however, it cannot be activated in scan times of less than 3 ms/division while in the bypass mode.

5-66. CHA XX – (CHANNEL A PUSHBUTTON). This signal is active low (0 Vdc) and +5 Vdc when inactive. Upon activating the channel A pushbutton, a single waveform will be presented on the display. The waveform will be presented in either the input, hold, recall or input-memory mode depending on which pushbutton was depressed last when the channel A mode was previously active. The channel A LED will be activated and the B view A mode disabled when the channel A mode is active. The controller will enter this mode on power up.

5-67. CHB XX – (B VIEW A PUSHBUTTON). This signal is active low (0 Vdc) and +5 Vdc when inactive. Upon activating the B VIEW A pushbutton, two waveforms will be presented on the display. The first waveform will be identical to the waveform presented on channel A before the B VIEW A pushbutton was depressed. The waveform mode on channel A cannot be altered unless the channel A pushbutton has been depressed. The second waveform will be in the mode that was active at the last time the B VIEW A pushbutton was depressed. The mode of waveform B may be altered until the channel A pushbutton is depressed. The B VIEW A LED will be active and the channel A mode disabled when the B VIEW A mode is active.

5-68. INPUT+, INPUT – (SIGNAL IN PUSHBUTTON). These signals are 1 and 0 respectively when active, and 0 and 1 respectively when inactive. When activated, either channel A or channel B (depending on which pushbutton was depressed last) will be continually updated from the input analog signals. The SIGNAL IN LED will be active and the hold, recall and input-memory modes disabled when this mode is active. The controller will enter this mode on power up.

5-69. HOLD X +, HOLD X – (HOLD PUSHBUTTON). These signals are 1 and 0 respectively when active, and 0 and 1 respectively when inactive. When activated, either channel A or channel B (depending on which pushbutton was depressed last) will be held. The update of input information will be stopped and the HOLD LED will be activated. The input mode is disabled when the hold mode is active. The hold mode cannot be activated while the recall mode is active.

5-70. RECAL +, RECAL – (RECALL PUSHBUTTON). These signals are 1 and 0 respectively when active, and 0 and 1 respectively when inactive. When activated, the memory contents of either channel A or B (depending on which pushbutton was depressed last) will be displayed. The RECALL LED will be active and the input, hold and input-memory modes will be inactive when the recall mode is active.

5-71. I – MEM +, I – MEM – (SIG-IN MEMORY PUSHBUTTON). These signals are 1 and 0 respectively when active, and 0 and 1 respectively when inactive. When activated, the contents of the recall memory of either channel A or B (depending on which pushbutton was depressed last) will be subtracted from the input waveform. The SIG-IN MEMORY LED will be active and the input and recall modes will be inactive when this mode is active. When subtracted, the resultant waveform will position a zero result in the center of the screen providing a bipolar waveform. A positive result of each subtraction will appear in the upper half of the screen while a negative result will appear in the lower half.

5-72. SAVE X +, SAVE X – (SAVE PUSHBUTTON). These signals are 1 and 0 respectively when active, and 0 and 1 respectively when inactive. When activated, the input waveform will be stored during the next complete input sweep into either the channel A or B recall memories (depending on which pushbutton was depressed last). The SAVE LED will be active from the time the pushbutton is activated until storage is completed. When the manual scan mode is active, the save function and LED will be active until the SAVE pushbutton is depressed a second time.

5-73. MANUL –. This signal originates from the SCAN MODE switch and is active when the switch is in the manual mode. This signal is 0 Vdc when active, and open when inactive.

5-74. AI1X1 +, AI1X2 +, AI1X3 +. These signals represent the coded outputs of the automatically selected IF bandwidth, and are +18 Vdc when active and -18 Vdc, when inactive. They represent automatically selected IF bandwidths of 10 kHz, 100 kHz, and 1 MHz, respectively. (Refer to Table 5-8.)

Table 5-8. Auto IF Bandwidth Signals

Signal	Auto IF Bandwidth Input			
	1000 kHz	100 kHz	10 kHz	1 kHz
AI 1X1 +	0	0	1	0
AI 1X2 +	0	1	0	0
AI 1X3 +	1	0	0	0

0 = - 18 Vdc
1 = +18 Vdc

5-75. OUTPUT SIGNALS. Paragraphs 5-76 through 5-92 provide descriptions of the output signals of the AILTECH 757 Spectrum Analyzer.

5-76. Horz. This signal is the horizontal output drive to the CRT display. The output voltage varies from approximately 0 Vdc (left side of display) to 1.5 Vdc (right side of display).

5-77. Vert. This signal is the vertical output drive to the CRT display. The output varies from approximately 0 Vdc (bottom of display) to 1.5 Vdc (top of display).

5-78. INTNS. This signal is the blanking output drive to the CRT display. The output varies from approximately 0 Vdc (blanked) to 1 Vdc (full intensity).

5-79. BAMP0 –, BAMP1 –. These signals are open collector active low outputs present at the rear panel for external monitoring of the amplitude scale. The signal coding is presented in Table 5-9.

Table 5-9. Vertical Scale Outputs

Signal	Vertical Scale Output			
	Linear	2 dB	5 dB	10 dB
BAMP0 –	1	0	1	0
BAMP1 –	1	1	0	0

0 = TTL Low
1 = Open Circuit (7416 Output)

5-80. BI000 –, BI001 –. These signals are open collector active low outputs present at the rear panel for external monitoring of the IF bandwidth. The signal coding is presented in Table 5-10.

Table 5-10. IF Bandwidth Outputs

Signal	IF Bandwidth Output			
	1 kHz	10 kHz	100 kHz	1 MHz
BI000 –	1	0	1	0
BI001 –	1	1	0	0

0 = TTL Low
1 = Open Circuit (7416 Output)

5-81. BI1X0 –, BI1X1 –, BI1X2 –, BI1X3 –. These signals are open collector active low outputs that drive the 1 kHz, 10 kHz, 100 kHz and 1 MHz IF bandwidth front panel LEDs.

5-82. SWXX0 –, SWXX1 –, SWXX2 –, SWXX3 –. These signals are open collector active low outputs present at the rear panel for external monitoring of the scan width. The signals are encoded as shown in Table 5-11.

5-83. STXX0 –, STXX1 –, STXX2 –, STXX3 –. These signals are open collector active low outputs present at the rear panel for external monitoring of the scan time. The signals are encloded as shown in Table 5-12.

5-84. Frequency Output Signals. The buffered frequency output signals are open collector active low outputs present at the rear panel for external monitoring of the center frequency. The signals are encoded as shown in Table 5-13.

5-85. Reference Level Outputs. The buffered reference level output signals are open collector active low outputs present at the rear panel for external monitoring of the reference level. These signals are encoded as shown in Tables 5-14 and 5-15.

5-86. BAD00 – Through BAD09 –. These ten signals are open collector active low. They represent the 1024 waveform horizontal positions on the screen in a binary form. BAD00 – is the least significant bit and BAD09 – is the most significant bit. All ten signals are available at the rear panel. (Refer to Table 5-16.)

Table 5-11. Scan Width Output Signals

Signal	Scan Width Outputs													
	1 kHz	3 kHz	10 kHz	30 kHz	100 kHz	300 kHz	1 MHz	3 MHz	10 MHz	30 MHz	100 MHz	200 MHz	500 MHz	700 MHz
SWXX0 –	1	0	1	0	1	0	1	0	1	0	1	0	1	0
SWXX1 –	1	1	0	0	1	1	0	0	1	1	0	0	1	1
SWXX2 –	1	1	1	1	0	0	0	0	1	1	1	1	0	0
SWXX3 –	1	1	1	1	1	1	1	1	0	0	0	0	0	0

0 = TTL Low
1 = Open Circuit (7416 Output)

Table 5-12. Scan Time Output Signals

Signal	Scan Time Outputs										
	10 sec	3 sec	1 sec	300 ms	100 ms	30 ms	10 ms	3 ms	1000 µs	100 µs	10 µs
STXX0 –	1	0	1	0	1	0	1	0	1	0	1
STXX1 –	1	1	0	0	1	1	0	0	1	1	0
STXX2 –	1	1	1	1	0	0	0	0	1	1	1
STXX3 –	1	1	1	1	1	1	1	1	0	0	0

0 = TTL Low
1 = Open Circuit (7416 Output)

Table 5-13. Frequency Output Signals

Signal	Center Frequency Digit Output									
	0	1	2	3	4	5	6	7	8	9
BFR51 –	1	0	1	0	1	0	1	0	1	0
BFR52 –	1	1	0	0	1	1	0	0	1	1
BFR54 –	1	1	1	1	0	0	0	0	1	1
BFR58 –	1	1	1	1	1	1	1	1	0	0

0 = TTL Low
1 = Open Circuit (7416 Output)

Coding for least significant digit of buffered center frequency.
(Coding of remaining digits is similar)

Table 5-14. Power Reference Digit Output

Signal	0	1	2	3	4	5	6	7	8	9
BPR21 –	1	0	1	0	1	0	1	0	1	0
BPR22 –	1	1	0	0	1	1	0	0	1	1
BPR24 –	1	1	1	1	0	0	0	0	1	1
BPR28 –	1	1	1	1	1	1	1	1	0	0

0 = TTL Low
1 = Open Circuit (7417 Output)

Least significant digit of buffered reference level
(The second least significant digit is encoded similarly.)

Table 5-15. Power Reference Sign and MSB Outputs

Signal	+	+1	-	-1
BPR01 –	1	0	1	0
PRFP +	1	1	0	0

0 = TTL Low
1 = Open Circuit (7416 Output)

Sign and most significant digit of buffered reference level.

Table 5-16. BAD00 – Through BAD09 – Outputs

Signal	Leftmost Vertical Line of Graticule	Center Line of Graticule		Rightmost Vertical Line of Graticule
BAD00 –	1	0	1	0
BAD01 –	1	0	1	0
BAD02 –	1	0	1	0
BAD03 –	1	0	1	0
BAD04 –	1	0	1	0
BAD05 –	1	0	1	0
BAD06 –	1	0	1	0
BAD07 –	1	0	1	0
BAD08 –	1	0	1	0
BAD09 –	1	1	0	0

0 = TTL Low
1 = Open Circuit (7416 Output)

5-87. BDAT0 – Through BDAT8 –. These nine lines are open collector active low. They represent 512 waveform vertical positions on the screen in a binary form. BDAT0 – is the least significant bit and BDAT8 – is the most significant bit. All nine signals are available at the rear panel. (Refer to Table 5-17.)

5-88. IN+ RC–. This line indicates whether the remote waveform data being transmitted is part of the input memory or recall memory. A low output (TTL Low) indicates the data is from a recall memory. Any open circuit (7416 output) indicates the data is from the input memory. This signal is available at the rear panel.

5-89. CA+ CB–. This line indicates whether the remote waveform data being transmitted is channel A data or channel B data. A low output (TTL Low) indicates the data is from channel B. An open circuit (7416 output) indicates the data is from channel A. This signal is available at the rear panel.

5-90. BSTRB –. This line is a buffered data strobe used to clock the output data, address, IN–RC+, CA–CB+ and BBLNK – signals. This strobe has a TTL low output and an open circuit high (7416 output). The strobe is low for 500NS and may be used to strobe the output data on its low to high transition. This signal is available at the rear panel.

5-91. BBLNK –. This line is a buffered active low output and an open circuit high (7416 output) signal. When low, this signal indicates that the data that is strobed by BSTRB – at the rear panel connector is invalid and should be blanked. This signal is available at the rear panel.

5-92. LUNCL –. This line has an open collector active low output and drives the UNCAL LED. The line will be active when any of the following conditions exist: scan time vernier is active, scan width vernier is active; the 1000 μs, 100 μs, or 10 μs scan time is chosen in the frequency domain, when a nonautomatic bandwidth setting is selected when not in the auto bandwidth mode, or when the variable video bandwidth is enabled.

Table 5-17. BDAT0 – Through BDAT8 – Outputs

Signal	Topmost Horizontal Line of Graticule	Center Horizontal Line of Graticule		Bottom-most Horizontal Line of Graticule
BDAT0 –	0	1	0	1
BDAT1 –	0	1	0	1
BDAT2 –	0	1	0	1
BDAT3 –	0	1	0	1
BDAT4 –	0	1	0	1
BDAT5 –	0	1	0	1
BDAT6 –	0	1	0	1
BDAT7 –	0	1	0	1
BDAT8 –	0	0	1	1

0 = TTL Low
1 = Open Circuit (7416 Output)

SECTION 6

ALIGNMENT AND ADJUSTMENT

6-1. INTRODUCTION

6-2. This section describes adjustments required to return the 757 Spectrum Analyzer to peak operating condition when repairs are required. Table 6-1 lists all of the adjustments by adjustment name, reference designator, adjustment paragraph, schematic diagram, figure number, and function. Figures 6-1 and 6-2 illustrate the location of adjustable components and test points. Included in this section are test setup procedures and check and adjustment procedures.

6-3. Data taken during adjustments should be recorded. Comparison of initial data with data taken during periodic adjustments assists in preventive maintenance and troubleshooting.

WARNING

With the covers removed, exposed terminals have voltages capable of causing death. The adjustments in this section should be performed only by a skilled technician who knows the hazard involved.

NOTE

Before performing any adjustments, allow one hour warm-up time for the instrument.

6-4. TEST EQUIPMENT REQUIRED

6-5. Table 1-3 contains a tabular listing of test equipment and test accessories required for the adjustment procedures. In addition, the table contains the required minimum specifications and a suggested manufacturer's model number.

6-6. BLADE TUNING TOOLS. For adjustments requiring a non-metallic tuning tool, use tuning tool, AILTECH part no. 293198-1. In situations not requiring non-metallic tuning tools, an ordinary small screwdriver or other suitable tool is sufficient. Never try to force any adjustment control in the 757 Spectrum Analyzer. This is especially critical when tuning variable slug-tuned inductors and variable capacitors.

6-7. FACTORY SELECTED COMPONENTS

6-8. Certain components of the AILTECH 757 Spectrum Analyzer are factory selected components. Factory selected components are designated by an asterisk (*) on the schematic diagrams in Section 7.

6-9. RELATED ADJUSTMENTS

6-10. Interactive control adjustments are noted in the procedures. These are indicated by paragraph number(s) as the adjustments that must be performed if an assembly has been replaced or repaired, or if an adjustment has been made on an assembly.

6-11. ADJUSTMENT PROCEDURES

6-12. LOW VOLTAGE POWER SUPPLY 1A4 AND REGULATOR BIAS PRINTED CIRCUIT BOARD 1A13 ADJUSTMENTS. To adjust Low Voltage Power Supply 1A4 and Regulator Bias Printed Circuit Board 1A13, proceed as follows:

1. Using a digital voltmeter, check the output voltages of Low Voltage Power Supply 1A4 (Figure 7-20). These voltages should be +18.3 ±0.1, -18.3 ±0.1, +24 ±1.2 and +5.1 ±0.2 Vdc and are adjustable by potentiometers 1A4A1R39, 1A4A1R25, 1A4A1R53 and 1A4A1R11, respectively.

2. Connect a digital voltmeter between test point 1A13TP4 on Regulator Bias Printed Circuit Board 1A13 (Figure 6-1) and chassis ground. Adjust -6V REF ADJ potentiometer 1A13R38 on Regulator Bias Printed Circuit Board 1A13 for a -6 ±0.005 Vdc reading.

Table 6-1. Adjustable Components

Adjustment	Reference Designation	Paragraph	Figure No.	Function
BAND 5 VCO OFFSET	1A2A3A2R23	6-18	6-2	Adjusts Yig oscillator tuning offset for band 5.
BAND 4 VCO OFFSET	1A2A3A2R26	6-17	6-2	Adjusts Yig oscillator tuning offset for band 4.
BAND 3 VCO OFFSET	1A2A3A2R29	6-16	6-2	Adjusts Yig oscillator tuning offset for band 3.
BAND 2 VCO OFFSET	1A2A3A2R32	6-15	6-2	Adjusts Yig oscillator tuning offset for band 2.
BAND 1 VCO OFFSET	1A2A3A2R35	6-14	6-2	Adjusts Yig oscillator tuning offset for band 1.
BAND 5 FILTER OFFSET	1A2A3A2R38	6-18	6-2	Adjusts Yig filter tuning offset for band 5.
BAND 4 FILTER OFFSET	1A2A3A2R41	6-17	6-2	Adjusts Yig filter tuning offset for band 4.
BAND 3 FILTER OFFSET	1A2A3A2R44	6-16	6-2	Adjusts Yig filter tuning offset for band 3.
BAND 2 FILTER OFFSET	1A2A3A2R47	6-15	6-2	Adjusts Yig filter tuning offset for band 2.
BAND 1 FILTER OFFSET	1A2A3A2R50	6-13, 6-14	6-2	Adjusts Yig filter tuning offset for band 1.
BAND 4 FILTER GAIN	1A2A3A3R14	6-17	6-2	Adjusts Yig filter sweep gain for band 4.
BAND 3 FILTER GAIN	1A2A3A3R17	6-16	6-2	Adjusts Yig filter sweep gain for band 3.
BAND 2 FILTER GAIN	1A2A3A3R20	6-15	6-2	Adjusts Yig filter sweep gain for band 2.
BAND 5 FILTER GAIN	1A2A3A3R89	6-18	6-2	Adjusts Yig filter sweep gain for band 5.
BAND 5 DIGITAL SLOPE	1A2A3A4R10	6-18	6-2	Adjusts counter for mid-band frequency readout alignment for band 5.
BAND 4 DIGITAL GAIN	1A2A3A4R52	6-17	6-2	Adjusts counter for end of band frequency readout alignment for band 4.
BAND 3 DIGITAL GAIN	1A2A3A4R54	6-16	6-2	Adjusts counter for end of band frequency readout alignment for band 3.
BAND 2 DIGITAL GAIN	1A2A3A4R56	6-15	6-2	Adjusts counter for end of band frequency readout alignment for band 2.
BAND 1 DIGITAL GAIN	1A2A3A4R58	6-14	6-2	Adjusts counter for end of band frequency readout alignment for band 1.
BAND 4 DIGITAL SLOPE	1A2A3A4R60	6-17	6-2	Adjusts counter for mid-band frequency readout alignment for band 4.
BAND 3 DIGITAL SLOPE	1A2A3A4R63	6-16	6-2	Adjusts counter for mid-band frequency readout alignment for band 3.
BAND 2 DIGITAL SLOPE	1A2A3A4R66	6-15	6-2	Adjusts counter for mid-band frequency readout alignment for band 2.

Table 6-1. Adjustable Components (Continued)

Adjustment	Reference Designation	Paragraph	Figure No.	Function
BAND 1 DIGITAL SLOPE	1A2A3A4R69	6-14	6-2	Adjusts counter for mid-band frequency readout alignment for band 1.
BAND 5 DIGITAL GAIN	1A2A3A4R72	6-18	6-2	Adjusts counter for end of band frequency readout alignment for band 5.
+5 VDC	1A4A1R11	6-12	7-20	Adjusts voltage level
-18.3 VDC	1A4A1R25	6-12	7-20	Adjusts voltage level
+18.3 VDC	1A4A1R39	6-12	7-20	Adjusts voltage level
+24 VDC	1A4A1R53	6-12	7-20	Adjusts voltage level
+24 VDC	1A4A1R12	—	7-20A	Adjusts voltage level
+5 VDC	1A4A1R32	—	7-20A	Adjusts voltage level
+18 VDC	1A4A1R51	—	7-20A	Adjusts voltage level
-18 VDC	1A4A1R71	—	7-20A	Adjusts voltage level
BCD Switch	1A6S1	6-37	7-21	Calibrates digital offset
BAND GAIN 1	1A10A1R19	6-26	7-24	Adjusts band gain (VSA) 1
BAND GAIN 3	1A10A1R21	6-26	7-24	Adjusts band gain (VSA) 3
BAND GAIN 2	1A10A1R27	6-26	7-24	Adjusts band gain (VSA) 2
BAND GAIN 5	1A10A1R41	6-26	7-24	Adjusts band gain (VSA) 5
3 1 MHz FILTER	1A10A1A2L23	6-23, 6-26	7-25	Adjusts 1 MHz filter shape
2 1 MHz FILTER	1A10A1A2L24	6-23, 6-26	7-25	Adjusts 1 MHz filter shape
1 1 MHz FILTER	1A10A1A2L25	6-23, 6-26	7-25	Adjusts 1 MHz filter shape
FILTER GAIN ADJUST	1A10A1A2R12	6-23, 6-26	7-25	Sets gain of filter relative to the other filters
FILTER GAIN ADJUST	1A10A1A2R17	6-23, 6-26	7-25	Sets gain of filter relative to the other filters
FILTER GAIN ADJUST	1A10A1A2R19	6-23, 6-26	7-25	Sets gain of filter relative to the other filters
FILTER GAIN ADJUST	1A10A1A2R21	6-23, 6-26	7-25	Sets gain of filter relative to the other filters
6 1 MHz FILTER	1A10A1A3L23	6-23, 6-26	7-25	Adjusts 1 MHz filter shape
5 1 MHz FILTER	1A10A1A3L24	6-23, 6-26	7-25	Adjusts 1 MHz filter shape
4 1 MHz FILTER	1A10A1A3L25	6-23, 6-26	7-25	Adjusts 1 MHz filter shape
2 21.4 AMP	1A10A1A5C6	6-23	7-24	Peak for max IF sensitivity
IF GAIN ADJ	1A10A1A5R3	6-36	7-23	Adjust IF gain for best sensitivity
1 21.4 AMP	1A10A1A5C10	6-23	7-24	Peak for max IF sensitivity
3 21.4 AMP	1A10A1A5C34	6-23	7-24	Peak for max IF sensitivity
IF GAIN ADJ	1A10A1A5R9	6-23	7-26	Adjusted at final test for -15 dBm at top of screen
LC circuit	1A10A4C2	6-25	7-29	Adjusts for maximum signal amplitude and flatness of comb lines
3.5 MHz ADJUST	1A10A5L5	6-29	7-31	Adjusts frequency accuracy

Table 6-1. Adjustable Components (Continued)

Adjustment	Reference Designation	Paragraph	Figure No.	Function
FILTER ADJ	1A10A5A1C4	6-31	7-30	Adjusts 3.5 MHz bandpass characteristic
FILTER ADJ	1A10A5A1C7	6-31	7-30	Adjusts 3.5 MHz bandpass characteristic
FILTER ADJ	1A10A5A1C9	6-31	7-30	Adjusts 3.5 MHz bandpass characteristic
FILTER ADJ	1A10A5A1C12	6-31	7-30	Adjusts 3.5 MHz bandpass characteristic
FILTER ADJ	1A10A5A1C14	6-31	7-30	Adjusts 3.5 MHz bandpass characteristic
FILTER ADJ	1A10A5A1C19	6-31	7-30	Adjusts 3.5 MHz bandpass characteristic
3.5 MHz AMP ADJ	1A10A5A2R7	6-29	7-31	Sets amplitude of 3.5 MHz oscillator
COMB ADJUST	1A10A5A3C14	6-30	7-31	Sets combs for equal spacing and linearity
COMB ADJUST	1A10A5A3C19	6-30	7-31	Sets combs for equal spacing and linearity
COMB ADJUST	1A10A5A3C25	6-30	7-31	Sets combs for equal spacing and linearity
100 MHz OSC	1A10A5A4C6	6-32	7-31	Sets oscillator frequency
100 MHz AMP	1A10A5A4C12	6-32	7-31	Sets oscillator output level
100 MHz OUT TUNE	1A10A5A4C14	6-32	7-31	Sets oscillator output level
POSITION	1A10A6A1R17	6-27	7-27	Adjust for linearity and equal spacing every 1 MHz
SLOPE	1A10A6A1R18	6-27	7-27	Adjust for linearity and equal spacing every 1 MHz
GAIN	1A10A6A1R22	6-27	7-27	Adjust for linearity and equal spacing every 1 MHz
FEEDBACK	1A10A6A2C1	6-27	7-27	Adjusts frequency for 248 MHz output
MAIN TUNING	1A10A6A2C2	6-27	7-27	Adjusts frequency for 248 MHz output
FM SWEEP CAL	1A10A12R22	6-35	7-32	Calibrates 1 and 3 MHz scan widths
PRIMARY LOOPGAIN	1A10A12R32	6-33	7-32	Adjusts primary phase lock loop
SECONDARY LOOP 2 GAIN	1A10A12R36	6-33	7-32	Adjusts secondary phase lock loop
BAND 5 TUNE RATE	1A10A12R48	6-18	7-32	Adjusts Yig filter tuning offset for band 5
BAND 5 FILTER TRACK	1A10A12R51	6-18	7-32	Ajusts Yig filter tracking in band 5
LC1	1A10A18LC1	6-23	7-28	Tuned circuit, for maximum signal gain on display
DISP CRT ADJ	1A11R12	6-13	6-1 7-33	Centers signal on display for all scan widths
FULL RANGE MARK	1A11R18	6-20	6-1 7-33	Adjusts position of full range marker
GAIN ADJ	1A11R21	6-13	6-1 7-33	Adjusts horizontal gain to CRT

Table 6-1. Adjustable Components (Continued)

Adjustment	Reference Designation	Paragraph	Figure No.	Function
HIGH FREQ BLANK	1A11R42	6-19	6-1 7-33	Clips high end of sweep
LOW FREQ BLANK	1A11R43	6-19	6-1 7-33	Clips low end of sweep
EXP OFF	1A12R8	6-38	6-1 7-34	Adjusts vertical position in reference mode
EXP GAIN	1A12R22	6-38	6-1 7-34	Adjusts vertical gain in reference mode
BAL	1A12R24	6-13	6-1 7-34	Adjusts display baseline to eliminate variation between amplitude ranges
LOG GAIN	1A12R25	6-13	6-1 7-34	Adjusts display vertical gain to change one graticule per 10 dB of IF attenuation
LIN OFF	1A12R31	6-21	6-1 7-34	Adjusts vertical position of signal in linear mode
LIN SHAPE	1A12R32	6-21	6-1 7-34	Adjusts shape of signal in linear mode
VIDEO OFF	1A12R36	6-39	6-1 7-34	Adjusts level of video signal to rear panel connector J6
LIN GAIN	1A12R47	6-21	6-1 7-34	Vertically compresses or expands signal when in linear mode
BAND 1 ADJ	1A13R2	6-14	6-1 7-35	Adjusts band 1 mixer bias
BAND 2 ADJ	1A13R3	6-15	6-1 7-35	Adjusts band 2 mixer bias
BAND 3 ADJ	1A13R4	6-16	6-1 7-35	Adjusts band 3 mixer bias
BAND 4 ADJ	1A13R5	6-17	6-1 7-35	Adjusts band 4 mixer bias
BAND 5 ADJ	1A13R6	6-18	6-1 7-35	Adjusts band 5 mixer bias
OFFSET NULL ADJ	1A13R15	6-34	6-1 7-35	Adjusts position of signal when auto centering is enabled
BAND GAIN ADJ	1A13R35	6-34	6-1 7-35	Adjusts total gain of auto centering circuit
+6 V REF ADJ	1A13R37	6-12	6-1 7-35	Adjusts +6 V reference
-6 V REF ADJ	1A13R38	6-12	6-1 7-35	Adjusts -6 V reference

Table 6-1. Adjustable Components (Continued)

Adjustment	Reference Designation	Paragraph	Figure No.	Function
X GAIN	1A19R6	6-41	6-1 7-41	Adjusts the horizontal gain of the characters and digital waveform
X OFFSET	1A19R7	6-41	6-1 7-41	Adjusts the horizontal offset of the characters and digital waveform
Y GAIN	1A20R5	6-41	6-1 7-42	Adjusts the vertical gain of the characters and digital waveform
LINE OFFSET	1A20R38	6-41	6-1 7-42	Adjusts the width of horizontal lines of the digital waveform
LINE LENGTH	1A20R39	6-41	6-1 7-42	Adjusts the length of the line adjoining two consecutive points of the digital waveform
WAVE OFFSET	1A20R40	6-41	6-1 7-42	Adjusts the vertical position of the digital waveform
Y OFFSET	1A20R41	6-41	6-1 7-42	Adjusts the vertical offset of the characters and digital waveform
DIGITAL INTENSITY OFFSET	1A20R42	6-41	6-1 7-42	Adjusts the relative intensity of different line lengths of the digital waveform
BYPASS INTENSITY GAIN	1A20R43	6-41	6-1 7-42	Adjusts the intensity of the analog bypass waveform
WAVEFORM CAL SWITCH	1A20S1	6-40	6-1 7-42	Provides an internal calibrate signal
RAMP GAIN	1A21R30	6-43	6-1 7-43	Adjusts the horizontal gain of the signal on the digital waveform
VIDEO OFFSET	1A21R31	6-42, 6-44	6-1 7-43	Adjusts the vertical position of the signal on the digital waveform
VIDEO GAIN	1A21R32	6-42, 6-44	6-1 7-43	Adjusts the vertical gain of the signal on the digital waveform
RAMP OFFSET	1A21R33	6-43	6-1 7-43	Adjusts the horizontal position of the signal on the digital waveform

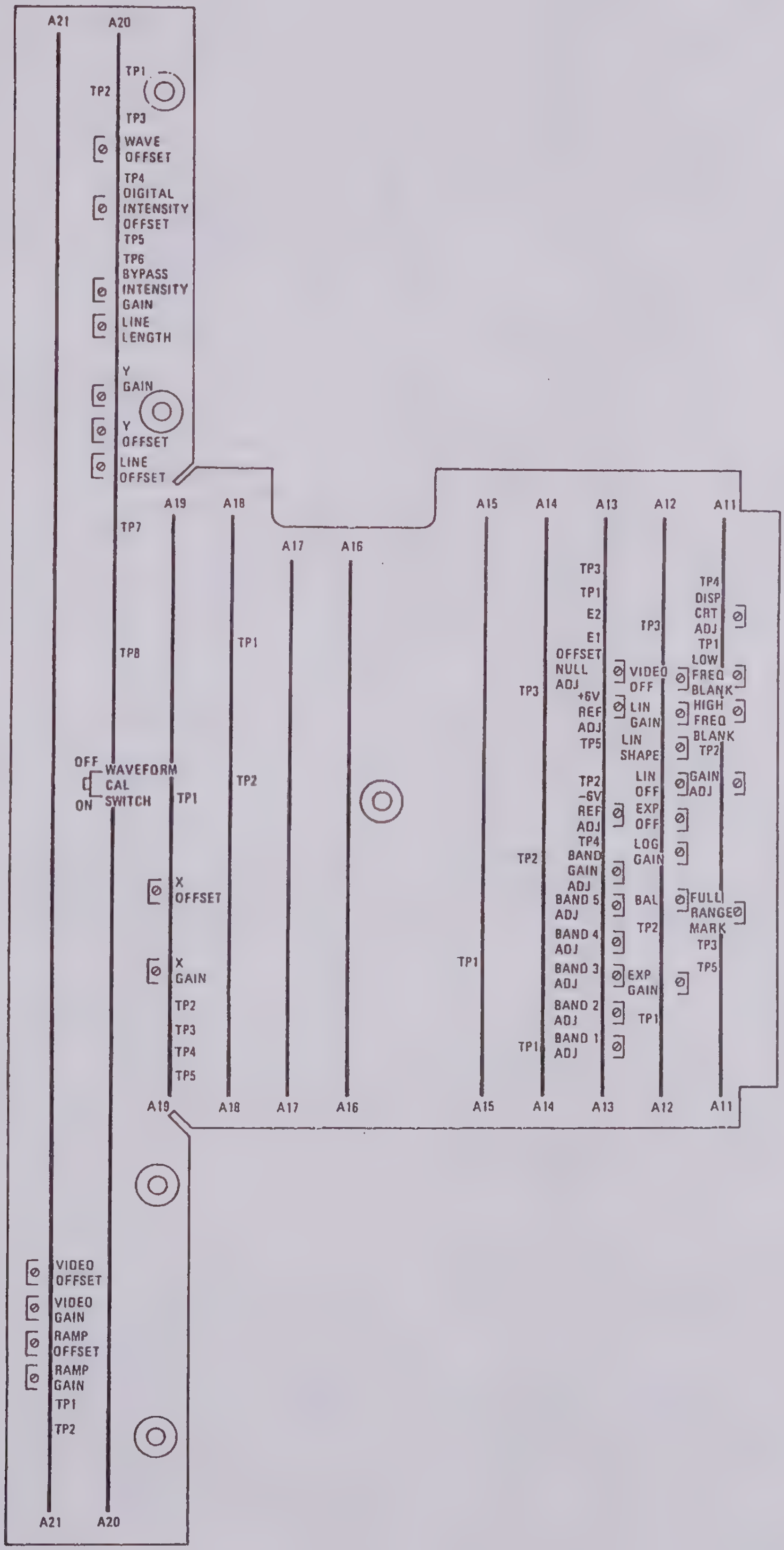

A21
A20
TP1
TP2
TP3
WAVE OFFSET
TP4
DIGITAL INTENSITY OFFSET
TP5
TP6
BYPASS INTENSITY GAIN
LINE LENGTH
Y GAIN
Y OFFSET
LINE OFFSET
A19
A18
A17
A16
A15
A14
A13
A12
A11
TP7
TP8
TP1
TP2
OFF
WAVEFORM CAL SWITCH
ON
TP1
X OFFSET
X GAIN
TP2
TP3
TP4
TP5
TP1
TP3
TP2
TP1
TP3
TP1
E2
E1
OFFSET NULL ADJ
+6V REF ADJ
TP5
TP2
-6V REF ADJ
TP4
BAND GAIN ADJ
BAND 5 ADJ
BAND 4 ADJ
BAND 3 ADJ
BAND 2 ADJ
BAND 1 ADJ
TP3
VIDEO OFF
LIN GAIN
LIN SHAPE
LIN OFF
EXP OFF
LOG GAIN
BAL
TP2
EXP GAIN
TP1
TP4
DISP CRT ADJ
TP1
LOW FREQ BLANK
HIGH FREQ BLANK
TP2
GAIN ADJ
FULL RANGE MARK
TP3
TP5
VIDEO OFFSET
VIDEO GAIN
RAMP OFFSET
RAMP GAIN
TP1
TP2
A19
A18
A17
A16
A15
A14
A13
A12
A11
A21
A20

Figure 6-1. Adjustable Component and Test Point Location Diagram for Card File Assemblies 1A11 Through 1A21

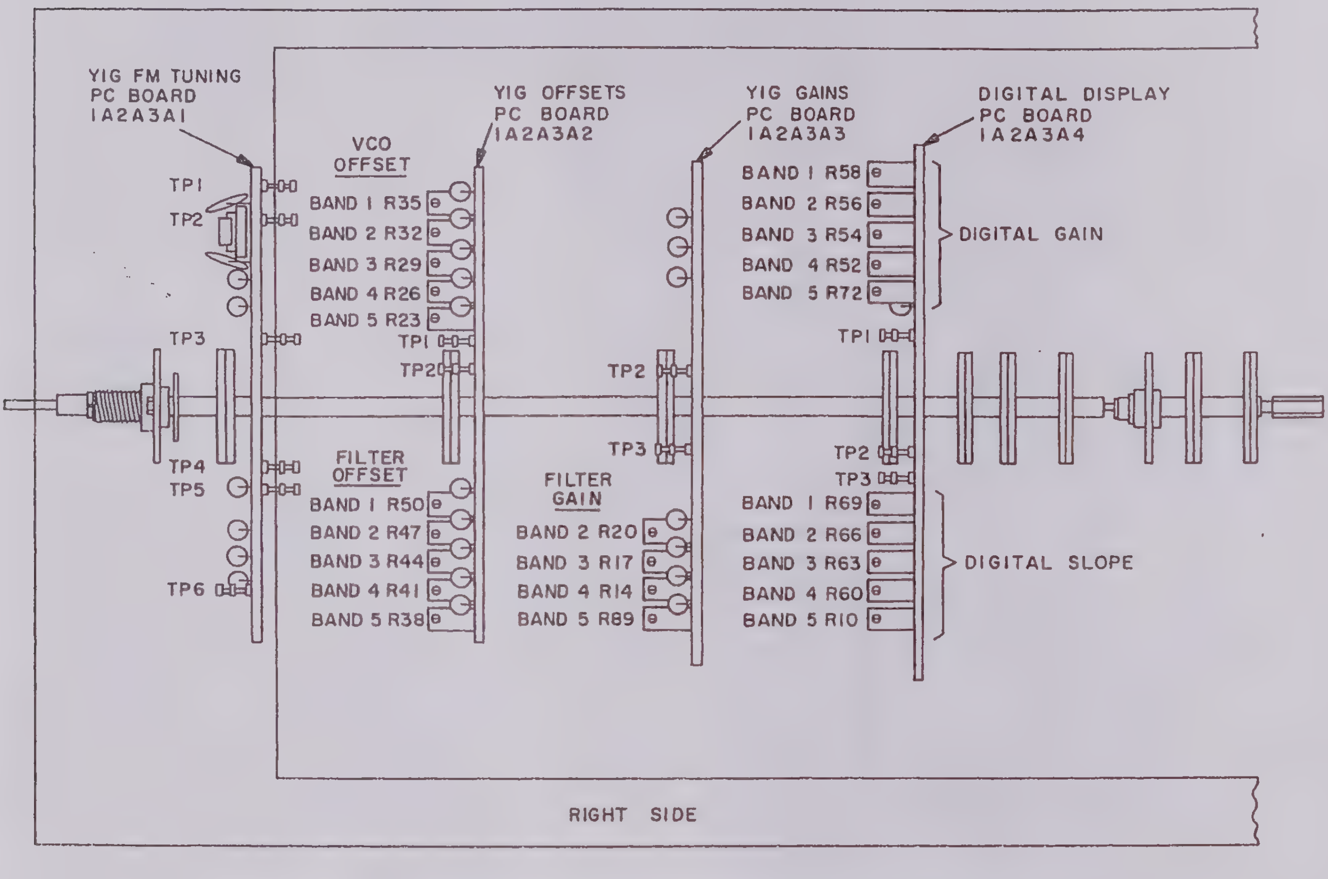

YIG FM TUNING PC BOARD 1A2A3A1
YIG OFFSETS PC BOARD 1A2A3A2
YIG GAINS PC BOARD 1A2A3A3
DIGITAL DISPLAY PC BOARD 1A2A3A4
VCO OFFSET
TP1
TP2
BAND 1 R35
BAND 2 R32
BAND 3 R29
BAND 4 R26
BAND 5 R23
TP1
TP2
TP3
TP2
BAND 1 R58
BAND 2 R56
BAND 3 R54
BAND 4 R52
BAND 5 R72
DIGITAL GAIN
TP1
TP3
TP4
TP5
FILTER OFFSET
BAND 1 R50
BAND 2 R47
BAND 3 R44
BAND 4 R41
BAND 5 R38
TP6
FILTER GAIN
BAND 2 R20
BAND 3 R17
BAND 4 R14
BAND 5 R89
TP2
TP3
BAND 1 R69
BAND 2 R66
BAND 3 R63
BAND 4 R60
BAND 5 R10
DIGITAL SLOPE
RIGHT SIDE

Figure 6-2. Adjustable Component and Test Point Location Diagram for RF Range Switch Assemblies 1A2A3A1 Through 1A2A3A4

3. Connect a digital voltmeter between test point A13TP5 on Regulator Bias Printed Circuit Board 1A13 and chassis ground. Adjust +6V REF ADJ potentiometer 1A13R37 on Regulator Bias Printed Circuit Board 1A13 (Figure 6-1) for a +6 ±0.005 Vdc reading.

6-13. HORIZONTAL AND VERTICAL ALIGNMENTS. To perform the horizontal and vertical alignments, proceed as follows:

1. Connect an AILTECH 70790 Comb Generator or equivalent to the RF INPUT connector on front panel of the AILTECH 757 Spectrum Analyzer.

2. Set the front panel controls to the following positions:

RF RANGE (GHz)	.001 – 2.0
RF ATTEN (dB)	10 [If 001 option is included this setting should be 20 dB for band 1 alignment]
IF ATTEN (dB)	10
SCAN WIDTH/DIV	200 MHz
SCAN WIDTH vernier	CAL
IF BANDWIDTH (KHz)	AUTO
EXPAND	NOISE

VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	$\boxed{10}$
SCAN MODE	$\boxed{\text{AUTO}}$
DOMAIN	FREQ
BASELINE	Maximum counter-clockwise
SCAN TIME/DIV	$\boxed{3}$
SCAN TIME vernier	CAL
CALIBRATE	Off
CONTRAST	Maximum counter-clockwise
FULL RANGE	OFF
SIGNAL CENTER	Centered
PRESELECTOR	IN
TUNING	Adjust to center trace on display
FREQ ADJ	Centered
BYPASS	On

3. Twenty comb lines should appear on the display. If not, adjust BAND 1 FILTER OFFSET potentiometer 1A2A3A2R50 (Figure 6-2) on Yig Offset Board (part of RF Range Switch Assembly 1A2A3) until 20 comb lines appear. Two settings are possible; the most clockwise setting is correct.

4. Adjust horizontal control ⟷ on front panel until trace begins on first graticule line (overlap on right side is normal).

5. Set SCAN WIDTH/DIV control to 100 MHz position. Adjust GAIN ADJ potentiometer 1A11R21 in Sweep Generator Printed Circuit Board 1A11 (Figure 6-1) while monitoring A11TP2 on an oscilloscope and set the sweep excursions for approximately 1.4 volt displacement. Adjust HORZ GAIN control on Front Panel so that each 100 MHz comb line falls on a graticule line. (Some adjustment of the TUNING control will be necessary to cause the first comb line to fall on first graticule line.)

6. Disconnect AILTECH 70790 Comb Generator. Adjust TUNING control to approximately 0 MHz until band 1 zero beat frequency signal is in the center of the display. Set SCAN WIDTH/DIV control to $\boxed{10}$ MHz position and recenter signal. Set SCAN WIDTH/DIV to 200 MHz position: zero beat should stay in center of display. If not, adjust DISP CRT ADJ potentiometer 1A11R12 in Sweep Generator Printed Circuit Board 1A11 (Figure 6-1).

NOTE

> Adjust potentiometer 1A11R12 only when the SCAN WIDTH/DIV control is in the 200 MHz position.

7. Turn TUNING control to center zero beat when the SCAN WIDTH/DIV control is set to $\boxed{10}$ MHz. Repeat above procedure (step 6) until signal remains centered as SCAN WIDTH/DIV is rotated.

8. Turn VAR VIDEO BW control counterclockwise approximately half way. Adjust BAL potentiometer 1A12R24 on Processed Video Printed Circuit Board 1A12 (Figure 6-1) until there is no baseline movement when the VERT SCALE/DIV is rotated between the 2, 5, and $\boxed{10}$ positions with the IF ATTEN (dB) control set to 100 dB position. Return the IF ATTEN (dB) control to 10 dB and adjust the vertical position control ↕ on the front panel in order to place the baseline on the −102 dB line.

9. Monitor test point TP1 on Processed Video Printed Circuit Board 1A12 with an oscilloscope, and set IF ATTEN (dB) control so that the scope displays an inverted video signal with a displacement of 1 volt from the peak to the center of the noise. Move the scope probe to test point TP3 and set the VERT SCALE/DIV switch to the 5 dB/division position.

10. Adjust LOG GAIN potentiometer 1A12R25 on Processed Video Printed Circuit Board 1A12 (Figure 6-1) for an inverted video signal with a displacement of 1.4 volts from the peak to the center of the noise. Adjust both the front panel vertical position control ↕ and VERT GAIN control so that the CRT displays a signal with the baseline on the −102 dB line and the peak of the signal on the 0 dB line. Set the VERT SCALE/DIV switch to $\boxed{10}$ and rotate the IF ATTEN (dB) control in 10 dB steps. Each step should cause the peak of the signal to change by one vertical division on the CRT display. It may be necessary to readjust LOG GAIN potentiometer 1A12R25 in order to achieve this calibration.

6-14. BAND 1 ALIGNMENT. Set all controls as in paragraph 6-13 step 2 and proceed as follows:

1. Connect an AILTECH 70790 Comb Generator to RF INPUT connector on Front Panel and turn TUNING control to center trace on display. Ground test point 1A14TP1 on Digital Display Printed Circuit Board No. 2 1A14 (Figure 6-1) with a clip lead. This centers the band on the display and disables the TUNING. The CENTER FREQUENCY (MHz) readout should indicate 1000 MHz. If not, adjust BAND 1 DIGITAL SLOPE potentiometer 1A2A3A4R69 (Figure 6-2) on RF Range Switch Assembly 1A2A3 for the proper reading.

2. Locate 1000 MHz comb line by counting 10 lines up from the zero beat line. (Note: Zero beat line does not change amplitude when RF ATTEN (dB) control is rotated.) The 1000 MHz line should fall in center of display. If not, adjust BAND 1 VCO OFFSET potentiometer 1A2A3A2R35 (Figure 6-2) on RF Range Switch Assembly 1A2A3. Adjust BAND 1 FILTER OFFSET potentiometer 1A2A3A2R50 (Figure 6-2) on RF Range Switch Assembly 1A2A3 for maximum amplitude.

3. R[illegible]d from test point TP1 on [illegible] Board No. 2 1A14, [illegible] and adjust TUNING [illegible] to center of display. Adjust [illegible]GITAL GAIN potentiometer [illegible]R58 (Figure 6-2) on RF Range Switch Assembly 1A2A3 until CENTER FREQUENCY (MHz) readout indicates 0 MHz. Set SCAN WIDTH/DIV control to 200 MHz position, RF ATTEN (dB) control to 40 and TUNING control to 1000 MHz. Adjust BAND 1 ADJ potentiometer 1A13R2 on Regulator Bias Printed Circuit Board 1A13 (Figure 6-1) until all signal amplitudes on display are maximized.

6-15. BAND 2 ALIGNMENT. To perform the band 2 alignment, set controls as in paragraph 6-13, step 2 and proceed as follows:

1. Set RF RANGE (GHz) to 1.8 – 4.0 GHz, SCAN WIDTH/DIV to 200 MHz, and TUNING to 3000 MHz (as read on CENTER FREQUENCY (MHz) readout).

2. Adjust BAND 2 VCO and FILTER OFFSET potentiometers 1A2A3A2R47, and 1A2A3A2R32 respectively, on RF Range Switch Assembly 1A2A3 and FILTER GAIN potentiometer 1A2A3A3R20 (Figure 6-2), until 20 scan lines appear on the display. These potentiometers should be adjusted for maximum gain at all comb signals displayed.

NOTE

> There are two responses: one with the Yig VCO on low side of filter (incorrect) and one with the Yig VCO on high side of filter (correct). Clockwise turning of all offset potentiometers increases frequency; therefore, the most clockwise response of VCO OFFSET potentiometer R32 and the most counterclockwise response of Yig FILTER OFFSET potentiometer R47 is correct.

3. Ground test point 1A14TP1 on Digital Display Printed Circuit Board No. 2 1A14 with a clip lead (Figure 6-1). This centers the band on display and disables TUNING. CENTER FREQUENCY (MHz) readout should indicate 3000 MHz; if not, adjust BAND 2 DIGITAL SLOPE potentiometer 1A2A3A4R66 (Figure 6-2) on RF Range Switch Assembly 1A2A3.

4. Locate 3000 MHz signal line on the display with a signal generator or frequency meter as in test setup of Figure 4-5. Adjust R32 (Figure 6-2) on RF Range Switch Assembly 1A2A3 to move this line to center of the display as SCAN WIDTH/DIV is decreased to $\boxed{10}$ MHz per division. R47 must be adjusted simultaneously in order to maintain peak response.

5. Returning SCAN WIDTH/DIV to 200 MHz, adjust BAND 2 FILTER GAIN potentiometer R20 (Figure 6-2) on RF Range Switch Assembly 1A2A3 until maximum amplitude occurs for all 20 lines displayed. It should be noted that these adjustments are optimized when SIGNAL CENTER control is at the center of its range.

6. Remove the clip lead from test point TP1 on Digital Display Printed Circuit Board No. 2 1A14 and ensure that 3000 MHz is still centered on the display. Adjust TUNING control if not centered. With SCAN WIDTH/DIV at 30 MHz, rotate TUNING control slowly counterclockwise and count 100 MHz comb lines until the 2000 MHz line (band 2 lower calibration point) is identified. Set SCAN WIDTH/DIV to $\boxed{10}$ MHz per division and center this line. Adjust BAND 2 DIGITAL GAIN potentiometer 1A2A3A4R56 (Figure 6-2) on RF Range Switch Assembly 1A2A3 until CENTER

FREQUENCY (MHz) readout indicates 2000 MHz. With a frequency meter or signal generator, verify that the comb line is indeed 2000 MHz.

7. Return SCAN WIDTH/DIV to 200 MHz position and TUNING to 3000 MHz. Adjust BAND 2 ADJ potentiometer 1A13R3 (Figure 6-1) on Regulator Bias Printed Circuit Board 1A13 for optimum gain at all comb signals displayed.

6-16. BAND 3 ALIGNMENT. To perform the band 3 alignment, set controls as in paragraph 6-13, step 2 and proceed as follows:

1. Set RF RANGE (GHz) to 3.3 – 8.3 GHz position, SCAN WIDTH/DIV to 200 MHz per division, TUNING control to 5800 MHz (as read on CENTER FREQUENCY (GHz) readout), and RF ATTEN (dB) control to 0 position.

2. Adjust BAND 3 VCO and FILTER OFFSET potentiometers and BAND 3 FILTER GAIN potentiometer 1A2A3A2R29, 1A2A3A2R44, and 1A2A3A3R17 on RF Range Switch Assembly 1A2A3 (Figure 6-2) until 50 scan lines appear on the display at maximum amplitude.

NOTE

> There are two responses: one with the Yig VCO on the low side of the filter (incorrect) and one with the Yig VCO on the high side of the filter (correct). Clockwise turning of all offset potentiometers increases frequency; therefore, the most clockwise response of potentiometer R29 and the most counterclockwise response of potentiometer R44 is correct.

3. Ground test point 1A14TP1 on Digital Display Printed Circuit Board No. 2 1A14 with a clip lead (Figure 6-1). CENTER FREQUENCY (MHz) readout should indicate 5800 MHz, if not, adjust BAND 3 DIGITAL SLOPE potentiometer 1A2A3A4R63 (Figure 6-2) on RF Range Switch Assembly 1A2A3.

4. Locate 5800 MHz line (center frequency, band 3) with signals generator or frequency meter. Adjust potentiometers R29 and R44 (Figure 6-2) on RF Range Switch Assembly 1A2A3 to move this line to center of screen as SCAN WIDTH/DIV is decreased to 10 MHz per division.

5. Set SCAN WIDTH/DIV to 500 MHz per division and adjust BAND 3 FILTER OFFSET and BAND 3 FILTER GAIN potentiometers 1A2A3A2R44 and 1A2A3A3R17 (Figure 6-2) on RF Range Switch Assembly 1A2A3 until maximum amplitude is displayed for all comb lines. It should be noted that these adjustments are optimized when SIGNAL CENTER control is at the center of its range.

6. Remove the clip lead from test point TP1 on Digital Display Printed Circuit Board No. 2 1A14 and verify that 5800 MHz is still in the center of the display. Adjust TUNING control if not centered. With SCAN WIDTH/DIV at 30 MHz, rotate TUNING control slowly counterclockwise and count 100 MHz comb lines until the 4800 MHz line (band 3 lower calibration point) is identified. Set SCAN WIDTH/DIV to 10 MHz per division and center this line. Adjust BAND 3 DIGITAL GAIN potentiometer 1A2A3A4R54 (Figure 6-2) on RF Range Switch Assembly 1A2A3 until CENTER FREQUENCY (MHz) readout indicates 3300 MHz. With a frequency meter or signal generator, verify that the comb line is indeed 3300 MHz. With a frequency meter or signal generator, SET SCAN WIDTH/DIV to 200 MHz and RF ATTEN (dB) control to 20.

7. Set TUNING to 5800 MHz and adjust BAND 3 ADJ potentiometer 1A13R4 on Regulator Bias Printed Circuit Board 1A13 (Figure 6-1) for optimum gain at all comb signals displayed.

6-17. BAND 4 ALIGNMENT. To perform the band 4 alignment set controls as in paragraph 6-13, step 2, and proceed as follows:

1. Set RF RANGE (GHz) to 5.4 – 12.4 GHz position, SCAN WIDTH/DIV to 200 MHz, TUNING control to 8900 MHz (as read on CENTER FREQUENCY (MHz) readout) and RF ATTEN (dB) control to 0 position.

2. Adjust BAND 4 VCO and FILTER OFFSET potentiometer and BAND 4 FILTER GAIN potentiometers 1A2A3A2R26, 1A2A3A2R41, and 1A2A3A3R14 on RF Range Switch Assembly 1A2A3 (Figure 6-2) until 70 scan lines appear on the display at maximum amplitude.

NOTE

> There are two responses: one with the Yig VCO on the low side of the filter (incorrect) and one with the Yig VCO on the high side of the filter (correct). Clockwise turning of all offset potentiometers increases frequency; therefore, the most clockwise response of potentiometer R26 and the most counterclockwise response of potentiometer R41 is correct.

3. Ground test point 1A14TP1 on Digital Display Printed Circuit Board No. 2 1A14 with a clip lead (Figure 6-1). CENTER FREQUENCY (MHz) readout should indicate 8900 MHz, if not, adjust BAND 4 DIGITAL SLOPE potentiometer 1A2A3A4R60 (Figure 6-2) on RF Range Switch Assembly 1A2A3.

4. Locate 8900 MHz line (center frequency, band 4) with signal generator or frequency meter. Adjust potentiometers R26 and R41 (Figure 6-2) on RF Range Switch Assembly 1A2A3 to move this line to center of display as SCAN WIDTH/DIV is decreased to $\boxed{10}$ MHz.

5. Set SCAN WIDTH/DIV to 700 MHz per division and adjust potentiometer 1A2A3A3R14 on RF Range Switch Assembly 1A2A3 until maximum amplitude is displayed for all comb lines. (Note: It may be necessary to degauss the Yig components from the hysteresis buildup. This is accomplished by exercising the SCAN WIDTH/DIV control from the 700 MHz to 10 MHz positions at least once.) Readjust potentiometers R41 and R14 (Figure 6-2) until maximum amplitude is displayed for all comb lines. It should be noted that these adjustments are optimized when SIGNAL CENTER control is at the center of its range.

6. Remove the clip lead from test point TP1 on Digital Display Printed Circuit Board No. 2 1A14 and verify that 8900 MHz is still in the center of the display. Adjust TUNING control if not centered. With SCAN WIDTH/DIV at 30 MHz, rotate TUNING control slowly counterclockwise and count 100 MHz comb lines until the 5400 MHz line (band 4 lower calibration point) is identified. Center this line at $\boxed{10}$ MHz per division and adjust BAND 4 DIGITAL GAIN potentiometer 1A2A3A4R52 (Figure 6-2) on RF Range Switch Assembly 1A2A3 until CENTER FREQUENCY (MHz) readout indicates 5400 MHz. Set SCAN WIDTH/DIV to 500 MHz position and RF ATTEN (dB) control to $\boxed{10}$ position.

7. Set TUNING to 8900 MHz and adjust BAND 4 ADJ potentiometer 1A13R5 on Regulator Bias Printed Circuit Board 1A13 (Figure 6-1) for optimum gain at all comb signals displayed.

6-18. BAND 5 ALIGNMENT. To perform the band 5 alignment, set controls as in paragraph 6-13, step 2 and proceed as follows:

1. Set RF RANGE (GHz) to 10 – 22 GHz position, SCAN WIDTH/DIV to 700 MHz, TUNING control to 16000 MHz (as read on CENTER FREQUENCY (GHz) readout), and RF ATTEN (dB) control to 0 position.

2. Adjust BAND 5 VCO and FILTER OFFSET potentiometers and BAND 5 FILTER GAIN potentiometer 1A2A3A2R23, 1A2A3A2R38, and 1A2A3A3R89 on RF Range Switch Assembly 1A2A3 (Figure 6-2) until 120 scan lines appear on the display at maximum amplitude.

NOTE

> There are two responses: one with the Yig VCO on the low side of the filter (incorrect) and one with the Yig VCO on the high side of the filter (correct). Clockwise turning of all offset potentiometers increases frequency; therefore, the most clockwise response of potentiometer R23 is correct, and the most counterclockwise response of potentiometer R38 is correct.

3. Ground test point 1A14TP1 on Digital Display Printed Circuit Board No. 2 1A14 with a clip lead (Figure 6-1). CENTER FREQUENCY (MHz) readout should indicate 16000 MHz; if not, adjust BAND 5 DIGITAL SLOPE potentiometer 1A2A3A4R10 (Figure 6-2) on RF Range Switch Assembly 1A2A3.

4. Locate 16000 MHz line (center frequency, band 5) with signal generator or frequency meter. Adjust potentiometers R23 and R38 on RF Range Switch Assembly 1A2A3 to move this line to center of display as SCAN WIDTH/DIV is decreased to $\boxed{10}$ MHz.

5. Set SCAN WIDTH/DIV to 700 MHz per division and adjust potentiometer 1A2A3A3R89 on RF Range Switch Assembly 1A2A3 until maximum amplitude is displayed for all comb lines. (Note: It may be necessary to degauss the Yig components from the hysteresis buildup. This is accomplished

by exercising the SCAN WIDTH/DIV control from the 700 MHz to 10 MHz positions at least once.) Readjust potentiometers R23 and R89 (Figure 6-2) until maximum amplitude is displayed for all comb lines. It should be noted that these adjustments are optimized when SIGNAL CENTER control is at the center of its range.

6. Remove the clip lead from test point TP1 on Digital Display Printed Circuit Board No. 2 1A14 and verify that 16000 MHz is still in the center of the display. Adjust TUNING control if not centered. With SCAN WIDTH/DIV at 30 MHz per division, rotate TUNING control slowly counterclockwise and count 100 MHz comb lines until the 10000 MHz line (band 5 lower calibration point) is identified. Center this line at 10 MHz per division and adjust BAND 5 DIGITAL GAIN potentiometer 1A2A3A4R72 (Figure 6-2) on RF Range Switch Assembly 1A2A3 until CENTER FREQUENCY (MHz) readout indicates 10000 MHz. Set SCAN WIDTH/DIV to 700 MHz.

7. Set TUNING to 16000 MHz and adjust BAND 5 ADJ potentiometer 1A13R6 on Regulator Bias Printed Circuit Board 1A13 (Figure 6-1) and potentiometer 1A10A12R48 on Yig Driver Printed Circuit board 1A10A12 (Figure 7-32) until all signals are maximized.

8. Set FULL RANGE control to the ON position. It may appear that the signal tracking has changed by rolling off at the high and low ends. To correct this, adjust potentiometer 1A10A12R51 on Yig Driver Printed Circuit Board 1A10A12 (Figure 7-32) for optimum tracking for band 5 only.

6-19. END BAND LIMITS ADJUSTMENT. To perform the end band limits adjustment, proceed as follows:

1. Set the front panel switches and controls to the following settings:

RF RANGE (GHz)	3.3 – 8.3
RF ATTEN (dB)	0
IF ATTEN (dB)	10
SCAN WIDTH/DIV	200 MHz
IF BANDWIDTH (KHz)	AUTO
VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	10
SCAN MODE	AUTO
BASELINE	Fully counterclockwise
CONTRAST	Fully counterclockwise
FULL RANGE	OFF
SIGNAL CENTER	Centered
TUNING	CENTER FREQUENCY (MHz) readout should read 3300 MHz
BYPASS	On

2. Adjust LOW FREQ BLANK potentiometer R43 (Figure 6-1) on Sweep Generator Printed Circuit Board 1A11 to blank all signals below 3300 MHz.

3. Set the TUNING control until CENTER FREQUENCY (MHz) readout indicates 8900 MHz. Adjust HIGH FREQ BLANK potentiometer R42 (Figure 6-1) on Sweep Generator Printed Circuit Board 1A11 to blank all signals above 8900 MHz.

4. Verify that 10 GHz and 22 GHz signals are present in band 5 and are not being blanked out. Adjust LOW FREQ BLANK potentiometer R43 on 1A11 if the 10 GHz signal is missing and HIGH FREQ BLANK potentiometer R42 on 1A11 if the 22 GHz signal is missing.

6-20. FULL RANGE MARKER ALIGNMENT. To perform the full range marker alignment, proceed as follows:

1. Set the front panel switches and controls to the following settings:

RF RANGE (GHz)	1.8 – 4.0
RF ATTEN (dB)	0
IF ATTEN (dB)	10

SCAN WIDTH/DIV	200 MHz
IF BANDWIDTH (KHz)	AUTO
VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	10
SCAN MODE	AUTO
BASELINE	Fully counterclockwise
CONTRAST	Fully counterclockwise
FULL RANGE	ON
SIGNAL CENTER	Centered
TUNING	CENTER FREQUENCY (MHz) readout should read 3000 MHz
BYPASS	On

2. Marker should be sitting in center of 3000 MHz line. Turn TUNING control so that CENTER FREQUENCY (MHz) readout indicates 3600 MHz. Adjust FULL RANGE MARK potentiometer R18 (Figure 6-1) on Sweep Generator Printed Circuit Board 1A11 so that the marker sits in the center of the 3600 MHz comb line. Set FULL RANGE switch to the OFF position.

6-21. LINEAR ADJUSTMENT. To perform the linear adjustment, proceed as follows:

1. Set the front panel switches and controls to the following settings:

RF RANGE (GHz)	1.8 – 4.0
RF ATTEN (dB)	0
IF ATTEN (dB)	As required
SCAN WIDTH/DIV	10
IF BANDWIDTH (KHz)	AUTO
VAR VIDEO BW	Fully clockwise
VERT SCALE/DIV	2 LOG
SCAN MODE	AUTO
BASELINE	Fully counterclockwise
CONTRAST	Fully counterclockwise
FULL RANGE	OFF
SIGNAL CENTER	Centered
TUNING	CENTER FREQUENCY (MHz) readout should read 3000 MHz
BYPASS	On

2. Set IF ATTEN (dB) control so that the amplitude of the 3000 MHz comb line just reaches the top of the display. Turn VERT SCALE/DIV switch to the LIN position. Adjust potentiometers R31 (LIN OFF), R32 (LIN SHAPE), and R47 (LIN GAIN), on Processed Video Printed Circuit Board 1A12 (Figure 6-1) so that the absolute amplitude of the signal and baseline is the same in LIN as in the 2 dB/div position and that an increase of 10 dB in IF attenuation in the LIN position will cause the signal to drop to the 68 dB graticule line on the display.

6-22. CATHODE RAY TUBE ALIGNMENT. Refer to Section 9 for the cathode ray tube alignment procedure.

6-23. IF PROCESSOR ASSEMBLY 1A10A1 ALIGNMENT. IF Processor Assembly 1A10A1 (Figure 7-24) consists of five subassemblies: Mixer 1A10A1A4, IF Amplifier 1A10A1A5, the first set of IF filters 1A10A1A3, IF Processor 1A10A1A1 (which contains the voltage select attenuators), and the last set of IF Filters 1A10A1A2. Alignment of the system consists of peaking IF amplifier 1 21.4 AMP capacitor 1A10A1A5C10 and peaking 3 21.4 AMP and 2 21.4 AMP capacitors C34 and C6 on IF Processor Board 1A10A1A1. These three capacitors should be peaked for maximum amplitude. In addition, IF GAIN ADJ potentiometer R9 on IF Amplifier Board 1A10A1A5 is adjusted at system level to achieve the proper IF gain. For each 1 MHz filter there are three inductors identified on Figure 7-24 as L25 1, L24 2, L23 3, and L25 4, L24 5 and L23 6. These inductors are adjusted to achieve a 1 MHz bandwidth filter with a 5:1 shape factor. The BAND GAIN 2, 3, 5, 1 voltage select attenuators on the IF Processor Board 1A10A1A1 are adjusted to compensate for the variation in conversion loss in each band. The last adjustment of IF Processor Assembly 1A10A1 is to set the FILTER GAIN ADJUST potentiometers R12, R17, R19 and R21. These adjustments balance out the IF filters to compensate for any loss in each of the filters.

6-24. RF AMPLIFIERS 1A10A18 AND 1A10A31 ADJUSTMENT. RF amplifiers 1A10A18 and 1A10A31 (Figure 7-28) have only one adjustment, LC1. This (LC1) is a tuned circuit and should be adjusted for maximum signal gain on the display of the 757 Spectrum Analyzer.

1. Set the front panel switches and controls to the following settings:

RF RANGE (GHz)	1.8 – 4.0
RF ATTEN (dB)	20
IF ATTEN (dB)	10
SCAN TIME/DIV	3
IF BANDWIDTH (KHz)	AUTO
VERT SCALE/DIV	10
SCAN WIDTH/DIV	200 MHz
SCAN MODE	AUTO
SIGNAL CENTER	Centered
FULL RANGE	OFF
BYPASS	On

2. Connect an AILTECH 70790 Comb Generator to the RF INPUT connector on the front panel 1A2.

3. Adjust the front panel TUNING control for a 3000 MHz reading on the CENTER FREQUENCY (MHz) readout.

4. Adjust LC1 in RF amplifiers 1A10A18 and 1A10A31 for maximum signal gain on the 757 Spectrum Analyzer display.

6-25. MIXER BIAS 1A10A4 ADJUSTMENT. Mixer Bias 1A10A4 (Figure 7-29) consists of an LC circuit.

1. Set the front panel switches and controls as indicated in paragraph 6-24 step 1.

2. Capacitor C2 should be adjusted for maximum signal amplitude and flatness of all comb lines.

6-26. FILTER RESPONSE VERIFICATION AND ADJUSTMENTS. To perform the filter response verification procedure, proceed as follows:

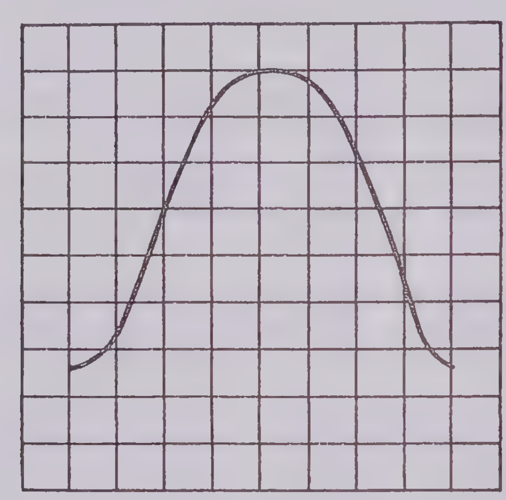
1. With the IF BANDWIDTH (KHz) switch in the AUTO position and the SCAN TIME/DIV switch in 3 position, refer to the following table and verify that the proper filters are being chosen as indicated by the front panel LEDs.

SCAN WIDTH/DIV	Filter Chosen
700 through 10 MHz	1 MHz
3 MHz through 300 kHz	100 KHz
100 through 30 kHz	10 KHz
10 through 1 kHz	1 KHz

2. Set the front panel switches and controls to the following settings:

RF RANGE (GHz)	1.8 – 4.0
RF ATTEN (dB)	20
IF ATTEN (dB)	10
SCAN TIME/DIV	3
IF BANDWIDTH (KHz)	1000
VERT SCALE/DIV	10
SCAN WIDTH/DIV	1 MHz
SCAN MODE	AUTO
SIGNAL CENTER	Centered
FULL RANGE	OFF
BYPASS	On

3. Using an AILTECH 70790 Comb Generator as an RF input signal, verify the waveshape of the 1 MHz filter by rotating the front panel TUNING control to place the following waveform in the center of the display.



1 MHz Waveform

4. If the waveshape is irregular, it can be tuned by varying the two sets of 1 MHz filters, inductors L23, 24 and 25 on IF Filter Assemblies 1A10A1A2 and 1A10A1A3, until a smooth waveshape is obtained.

5. To verify the gain of all four IF filters change the IF BANDWIDTH switch to AUTO position, then set the SCAN WIDTH/DIV switch to the 1 KHz per division position while maintaining a signal in the center of the display. Position the IF BANDWIDTH (KHz) switch to 1; adjust IF ATTEN (dB) control for a convenient reference on the display. Set the IF BANDWIDTH (KHz) switch to 10. The level of the 10 KHz filter should be the same as the 1 KHz potentiometer R21; if not, adjust the 10 KHz FILTER GAIN ADJUST potentiometer R19 until the level is the same as the reference. Set IF BANDWIDTH (KHz) switch to the 100 position. The signal should be on the same reference line as the 1 KHz level. Adjust the 100 KHz FILTER GAIN ADJUST potentiometer R17 until the level is the same as the reference. Repeat the procedure for the 1 MHz IF filter by adjusting the 1 MHz FILTER GAIN ADJUST potentiometer R12. By rotating the IF BANDWIDTH (KHz) switch between 1 and 1000 KHz, the level should be the same within ±2 dB.

NOTE

> When performing steps 6 through 9 verify that the Yig filter is tracking properly by peaking the signal. This is accomplished by varying the SIGNAL CENTER control for maximum amplitude of the signal in each band.

6. The voltage select attenuators (VSA) control the absolute video gain between bands. They are set as follows. Set the SCAN WIDTH/DIV switch to 10 MHz per division and the RF RANGE (GHz) switch to 5.4 – 12.4 GHz (band 4) and set RF ATTEN (dB) control to 0. Set the TUNING control so that the CENTER FREQUENCY (MHz) readout indicates 8900 MHz. Vary the IF ATTEN (dB) control so that a convenient reference can be set on the display. Vary the AMPL ADJ control on the front panel so that the REF LEVEL on the display is correct for the 8900 MHz calibration signal as indicated on the calibration chart. Set the RF RANGE (GHz) switch to the 10 – 22 GHz range (band 5). Set the TUNING control so that the CENTER FREQUENCY (MHz) readout indicates 16000 MHz. The REF LEVEL on the display should now be correct for the 16000 MHz signal on the calibration chart. If necessary adjust BAND 5 GAIN potentiometer 1A10A1R41 to achieve this calibration.

7. Set the RF RANGE (GHz) switch to 3.3 – 8.3 GHz (band 4). Set the TUNING control so that the CENTER FREQUENCY (MHz) readout indicates 5800 MHz. The REF LEVEL on the display should now be correct for the 5800 MHz signal on the calibration chart. If necessary adjust BAND 3 GAIN potentiometer 1A10A1R21 to achieve this calibration.

8. Set the RF ATTEN (dB) control to 10 and set the RF RANGE (GHz) switch to 1.8 – 4.0 (band 2). Set the TUNING control so that the CENTER FREQUENCY (MHz) readout indicates 3000 MHz. The REF LEVEL on the display should now be correct for the 3000 MHz signal on the calibration chart. If necessary adjust BAND 2 GAIN potentiometer 1A10A1R27 to achieve this calibration.

NOTE

If the instrument is equipped with a 001 Increased Sensitivity option, an additional 20 dB of RF attenuation must be selected whenever the RF RANGE (GHz) switch is set to band 1 position.

9. Set the RF ATTEN (dB) control to 20 and set the RF RANGE (GHz) switch to .001 – 2.0 (band 1). Set the TUNING control so that the CENTER FREQUENCY (MHz) readout indicates 1000 MHz. The REF LEVEL on the display should now be correct for the 1000 MHz signal on the calibration chart. If necessary adjust BAND 1 GAIN potentiometer 1A10A1R19 to achieve this calibration.

6-27. LOCAL OSCILLATOR 1A10A6 ALIGNMENT.

CAUTION

If the local oscillator fails to perform, special test equipment is required to properly align this assembly. Obtain a replacement assembly which is factory aligned and perform steps 2 and 3 to ensure system alignment.

1. Set the front panel switches and controls to the following positions:

RF RANGE (GHz)	1.8 – 4.0
RF ATTEN (dB)	0
IF ATTEN (dB)	0
SCAN TIME/DIV	3
IF BANDWIDTH (KHz)	100
VERT SCALE/DIV	10
SCAN WIDTH/DIV	1 MHz
SCAN MODE	AUTO
SIGNAL CENTER	Centered
FULL RANGE	OFF
BYPASS	On

2. Ground test point TP2 on Regulator Bias Printed Circuit Board 1A13.

3. Set SCAN WIDTH/DIV switch to 300 KHz per division. Disconnect cable W11 from 227 MHz Bandpass Filter 1A10A20 input and connect the output of an AILTECH 360 Frequency Synthesizer adjusted for 227.000 MHz at -30 dBm to connector 1A10A20J1.

4. Adjust MAIN TUNING capacitor C2 on LCVCO Oscillator II 1A10A6A2 (Figure 7-27) (part of Local Oscillator 1A10A6) to place the signal in the center of the display.

5. Disconnect the 360 Frequency Synthesizer connected in step 3 and connect a HP8406 Comb Generator set for 1 MHz comb lines to connector 1A10A20J1.

6. Rotate TUNING control on front panel of the 757 Spectrum Analyzer to place one of the displayed signals to the left most graticule.

7. Adjust TUNING control and GAIN potentiometer R22 on LCVCO Shaper 1A10A6A1 to obtain exactly four 1 MHz lines.

6-28. LOOP CONTROL 1A10A5 ALIGNMENT. Loop Control 1A10A5 (Figure 7-30) consists of four subassemblies; Loop Control 1A10A5A1, 3.5 MHz Oscillator 1A10A5A2, Comb Source 1A10A5A3 and 100 MHz Oscillator 1A10A5A4.

6-29. 3.5 MHz Oscillator 1A10A5A2 Alignment. To verify the operation of 3.5 MHz Oscillator 1A10A5A2, set the unit into the phase lock mode (kHz position of SCAN WIDTH/DIV switch) and verify that the output power of 3.5 MHz Oscillator 1A10A5A2 is approximately +7 dBm ±0.5 dB. Adjust 3.5 MHz AMP ADJ potentiometer 1A10A5A2R7 to obtain proper power output. Verification of frequency can be achieved on a frequency counter. The crystal oscillator frequency should be 3.500000 ±10 Hz. To achieve this accuracy adjust the 3.5 MHz ADJUST inductor 1A10A5L5.

6-30. Comb Source 1A10A5A3 Alignment. To align Comb Source 1A10A5A3, proceed as follows:

1. Set the front panel switches and controls to the following positions:

RF RANGE (GHz)	1.8 – 4.0
RF ATTEN (dB)	0
IF ATTEN (dB)	10
IF BANDWIDTH (KHz)	AUTO
SCAN TIME/DIV	3
SCAN WIDTH/DIV	500 MHz
BYPASS	On
TUNING	CENTER FREQUENCY (MHz) readout should indicate 3 GHz

2. Refer to Figure 7-23 and place a clip lead between the -18 VDC terminal FL5 of Comb Source 1A10A5A3 on the Loop Control 1A10A5A1 and a source of -18 volts in the system.

3. Using Figure 7-23 for reference location, disconnect cable W1 from Fixed Attenuator 1A10A25J1 and connect a cable with low loss in the frequency range of 2 GHz to 4 GHz between connector 1A10A25J1 and RF INPUT connector on the front panel.

4. Adjust the IF ATTEN (dB) control to achieve a reference level readout on the display of 0 dBm.

5. Adjust COMB ADJUST capacitors C14, C19, and C25 (comb adjust 1, 2, and 3, respectively) on Comb Source 1A10A5A3 until a display similar to that in Figure 7-31 is obtained. Multiple adjustments of capacitors C14, C19, and C25 will be necessary in order to achieve this display. All of the display should occur between the 35 and 65 dB graticule as shown in Figure 7-31.

6. Set the SCAN WIDTH/DIV switch to 10 MHz per division and IF BANDWIDTH (KHz) switch to 100 KHz position.

7. Slowly tune the analyzer from 1.8 to 4.0 GHz and examine the comb lines for 2 MHz uniform spacing. There should not be any 1 MHz comb lines present when Comb Source 1A10A5A3 has been properly tuned. If there are, it will be necessary to repeat the previous steps and readjust COMB ADJUST capacitors C14, C19, and C25 until this does not occur.

8. Reconnect cable W1 to Fixed Attenuator connector 1A10A25J1 and remove clip lead from filter 1A10A5A3FL5.

6-31. Loop Control 1A10A5A1 Alignment. This assembly requires specialized alignment equipment and should be replaced if it becomes defective. In order to verify its correct operation the following procedure should be utilized.

1. Set the front panel switches and controls to the following positions:

RF RANGE (GHz)	.001 – 2.0
RF ATTEN (dB)	30
IF ATTEN (dB)	20
IF BANDWIDTH (KHz)	AUTO
SCAN TIME/DIV	3
SCAN WIDTH/DIV	1 MHz
TUNING	CENTER FREQUENCY (MHz) readout should indicate 3 MHz

2. Using Figure 7-23 for reference location, disconnect cable W3 from connector 1A10A5J1 (3.5 MHz INPUT) and connect a clip lead from filter 1A10A5FL2 to a -18.3 volt source. Connect a clip lead from filter 1A10A5FL1 to +18.3 volt source. Connect a signal generator (HP 606 or equivalent) tuned to 3.5 MHz at -20 dBm to connector 1A10A5J1 (3.5 MHz INPUT). Connect a clip lead from filter 1A10A5FL3 (8 Hz DIS) to ground.

3. Connect an oscilloscope probe to the RF INPUT connector on the front panel of the spectrum analyzer. Monitor 1A10A5 IF T.P. with the oscilloscope probe.

4. A signal should appear on the spectrum analyzer near the center of the display. Adjust the IF ATTEN (dB) control to place the peak of the signal on the 40 dB line of the display.

5. Reduce the output of the signal generator in dB steps until the signal on the analyzer reduces by at least 5 dB. Note the power out of the signal generator, this is the limiting level of the amplifier. The specified limiting level is -80 dBm. Therefore with a generator output greater than -80 dBm, the monitored signal should not decrease by 5 dB.

6. In order to verify the bandwidth of the amplifier, set the generator output level to -90 dBm and change the frequency of the generator both up and down in frequency until the monitored signal drops an additional 3 dB. The 3 dB bandwidth should be 3.25 MHz to 3.75 MHz (500 KHz bandwidth).

7. Remove the oscilloscope probe from test point 1A10A5 IF T.P. and the RF INPUT connector on the analyzer front panel. Connect the probe to an oscilloscope and monitor filter 1A10A5FL4. Remove the clip lead to ground from filter 1A10A5FL3 (8 Hz DIS). A sinewave of approximately 8 Hz with a peak-to-peak voltage greater than 1 volt should appear on the scope.

8. Remove all clip leads and reconnect cables W3 and W5.

6-32. 100 MHz Oscillator 1A10A5A4 Alignment. To align the 100 MHz Oscillator 1A10A5A4, proceed as follows referring to Figure 7-23:

CAUTION

> Any adjustments of this oscillator will cause the calibration of the reference level to change. It will be necessary to perform paragraph 4-14 in the calibration section of this manual after adjusting this oscillator.

1. Disconnect the cable from connector 1A10A5A4J5 (100 MHz OUTPUT) and connect a 20 dB 2 watt attenuator to connector J5. Connect the output of the attenuator to a frequency counter.

2. Turn on the CALIBRATE signal on the spectrum analyzer front panel. Adjust 100 MHz OSC capacitor 1A10A5A4C6 for 100.000.000 MHz ±1000 Hz as indicated on the frequency counter.

3. Turn the CALIBRATE signal on and off several times to ensure that the oscillator will always turn-on.

4. Reconnect the cable that was disconnected in step 1 to connector 1A10A5A4J5.

5. Set the front panel switches and controls to the following positions:

RF RANGE (GHz)	1.8 – 4.0
RF ATTEN (dB)	10
IF ATTEN (dB)	10
IF BANDWIDTH (KHz)	AUTO
SCAN TIME/DIV	3
SCAN WIDTH/DIV	500 MHz
TUNING	CENTER FREQUENCY (MHz) readout should indicate 3000 MHz
CALIBRATE	On

6. Adjust the 100 MHz AMP capacitor 1A10A5A4C12 and 100 MHz OUT TUNE capacitor 1A10A5A4C14 for a group of 20 comb lines at the maximum and most equal amplitude.

7. Change the RF ATTEN (dB) control to 0 position and the SCAN WIDTH/DIV switch to 30 MHz. Ensure that only 3 comb signals appear, spaced 3.3 horizontal divisions apart, with no spurious signals appearing at low levels near the noise baseline. Readjustment of capacitors C12 and C14 may be required to eliminate any spurious signals.

6-33. PHASE LOCK ALIGNMENT. In order to perform the phase lock alignment, Loop Control 1A10A5 must be operating properly and be properly aligned (refer to paragraph 6-28). In addition, Loop Control 1A10A5 and associated mixers, RF cabling and hardware must be in proper operational order. When these prerequisites have been attained, align phase lock as follows:

1. Set the front panel switches and controls to their AUTO or standard operating positions ☐:

RF RANGE (GHz)	1.8 – 4.0
TUNING	3000 MHz
CALIBRATE	On

2. Connect a clip lead from test point TP2 to ground on Regulator Bias Printed Circuit Board 1A13.

3. Refer to Figures 7-23 and 7-32 for adjustment locations.

4. Adjust PRIMARY LOOP GAIN and SECONDARY LOOP GAIN potentiometers R32 and R36 on Yig Driver PC Board 1A10A12 fully counterclockwise.

5. Disconnect cable W1 from Fixed Attenuator connector 1A10A25J1.

6. Adjust the front panel TUNING control in order to center the 3000 MHz signal on the display.

7. Set the SCAN WIDTH/DIV switch to 300 KHz and the SCAN TIME/DIV switch to 300 mSEC positions. Adjust the TUNING control in order to center the signal on the display.

8. Rotate PRIMARY LOOP GAIN potentiometer R32 clockwise until the signals on the display expand ±2.5 divisions from the center of the display (Total of 5 divisions).

9. Rotate SECONDARY LOOP GAIN potentiometer R36 clockwise until the signals expand to fill the entire display (Total of 10 divisions).

10. Remove the clip lead from test point 1A13TP2 and ground and reconnect cable W1 to connector 1A10A25J1.

6-34. AUTO CENTERING ALIGNMENT. To perform the auto centering alignment, proceed as follows:

1. Set the RF RANGE (GHz) switch to 5.4 – 12.4 (band 4) with 8000 MHz in the center of the display and depress the CALIBRATE signal pushbutton.

2. Set the SCAN WIDTH/DIV switch to 100 MHz per division. Monitor test point TP2 on Regulator Bias Printed Circuit Board 1A13 (Figure 6-1) using a digital voltmeter.

3. Adjust OFFSET NULL ADJ potentiometer R15 on Regulator Bias Printed Circuit Board 1A13 (Figure 6-1) until the voltmeter indicates 0 V ±10 mV.

4. Set SCAN WIDTH/DIV to 1 MHz per division and center a signal on the display of the 757 Spectrum Analyzer.

5. Set SCAN WIDTH/DIV to 300 KHz per division. The signal should move close to the center of the display. If it does not, adjust BAND GAIN ADJ potentiometer R35 on Regulator Bias Printed Circuit Board 1A13 (Figure 6-1) until the signal moves to the center of the display.

6. Set SCAN WIDTH/DIV to 1 MHz per division and center the signal.

7. Set SCAN WIDTH/DIV switch to 300 KHz per division. The signal should move back to within one division of offset from the center.

8. Verify that auto centering works in all five RF ranges by selecting a signal in each range and repeating steps 6 and 7. At step 7 the signal should move to within 2 divisions of offset from the center.

6-35. FM CALIBRATION ALIGNMENT. To perform the FM calibration alignment, proceed as follows:

1. Set SCAN WIDTH/DIV to 1 MHz per division, IF BANDWIDTH (KHz) switch to 10 KHz per division and RF RANGE (GHz) switch to 1.8 – 4.0 (band 2).

2. Using an HP8406A Comb Generator set at 1 MHz, ten lines should appear, one per division.

3. If ten lines do not appear at one per division, adjust FM SWEEP CAL ADJ potentiometer R22 on Yig Driver Board 1A10A12 to achieve this condition.

6-36. IF GAIN ADJUSTMENT. To perform this adjustment proceed as follows:

CAUTION

> After making this adjustment it will be necessary to perform the adjustment procedures in paragraph 6-37 in order to restore an accurate reference level calibration.

1. Set the front panel switches and controls to their AUTO or standard operating positions ☐:

RF RANGE (GHz)	1.8 – 4.0
IF ATTEN (dB)	0
IF BANDWIDTH (KHz)	1
VAR VIDEO BW	Fully counter-clockwise
CALIBRATE	Off

2. Refer to Figure 7-23 for adjustment locations and adjust IF GAIN ADJ potentiometer R3 on IF Amplifier PC Board 1A10A1A5 fully counter-clockwise. This action will move the noise baseline level towards the bottom of the display.

3. Slowly rotate IF GAIN ADJ potentiometer R3 in a clockwise direction until the noise baseline increases 1 to 2 dB. This is the optimum setting.

6-37. POWER READOUT ADJUSTMENT. To perform the power readout adjustment, proceed as follows:

1. Set AMPL ADJ control to mid-range, on the front panel. This is indicated by a position marker being vertical.

2. Verify that the VERT SCALE/DIV switch is set to 10 and all switches and controls are in their AUTO or standard operating positions ☐.

RF RANGE (GHz)	1.8 – 4.0
TUNING	3000 MHz

3. Connect a signal generator set to 3000 MHz at -10 dBm to the spectrum analyzer front panel RF INPUT connector.

4. Vary the IF ATTEN (dB) control until the signal is on the -10 dB graticule line.

5. Set IF ATTEN (dB) control for 100 dB and verify that the noise is on the 102 dB graticule line. If not, vary the vertical offset control ‡ on the display until it is. Remove IF attenuation until the signal is again on the -10 dB graticule line.

6. Verify that the REF LEVEL alphanumeric reads 0 dBm. If not, readjust the BCD switch S1 on Absolute Power Board 1A6 or the AMPL ADJ control on the front panel until it does. The 757 Spectrum Analyzer is now calibrated for absolute power.

6-38. EXPAND NOISE/REFERENCE ADJUSTMENT. To perform the expand noise/reference adjustment, proceed as follows:

1. Set the front panel switches and controls to AUTO or standard operating positions ☐.

RF RANGE (GHz)	1.8 – 4.0
TUNING	3000 MHz
CALIBRATE	On

2. Set the IF ATTEN (dB) control for 100 dB and verify that the noise is on the 102 dB graticule line. If not, vary the vertical offset control ‡ on the display until it is.

3. With the EXPAND control set to NOISE position, reduce the IF attenuation until the peak of the signal reaches the 0 dB line on the graticule.

4. Set the EXPAND control to REF position and adjust EXP OFF potentiometer R8 on Processed Video PC Board 1A12 to return the peak of the signal to the 0 dB line. The peak of the signal should remain on the 0 dB line as the EXPAND control is varied from NOISE to REF positions.

5. Set the EXPAND control to REF and VERT SCALE/DIV control to LOG 5, then LOG 2, and adjust EXP GAIN potentiometer R22 on Processed Video PC Board 1A12 in order to return the peak of the signal to the 0 dB line. Note that potentiometers R8 and R22 interact, therefore repeat steps 4 and 5 until the peak of the signal remains at the 0 dB line under all of the switch conditions.

6-39. VIDEO OFFSET ADJUSTMENT. To adjust the video offset, proceed as follows:

1. Using an oscilloscope, monitor the video output on the rear panel at connector J6.

2. Set IF ATTEN (dB) control to 100 dB position.

3. Establish a 0 volt reference on the oscilloscope.

4. Vary VIDEO OFF potentiometer R36 on the Processed Video Printed Circuit Board 1A12 (Figure 6-1) until the DC offset is less than 100 mV as displayed on the oscilloscope.

5. Reduce the IF attenuator setting.

6. Verify that as the noise increases the dc level on the oscilloscope moves in a positive direction.

6-40. CRT CONTROLLER ALIGNMENT. The following CRT controller alignment is to be performed when calibrating the 757 Spectrum Analyzer CRT Controller. Table 6-1 lists all the required adjustments along with their function and designation. Figure 6-3 is included to depict a properly calibrated CRT controller with WAVEFORM CAL SWITCH S1 on Pushbutton Interface/Line Generator Printed Circuit Board 1A20 in the ON position and with B VIEW A pushbutton depressed.

1. Set the front panel switches and controls to AUTO or standard operating positions ☐.

RF RANGE (GHz)	1.8 – 4.0
CALIBRATE	On
BYPASS	On

2. Depress the READOUT DISABLE pushbutton in order to extinguish the corresponding LED and light up the characters on the display as indicated in Figure 6-3.

6-41. CHARACTER AND TOTAL DIGITAL VIDEO ALIGNMENT.

1. Adjust X OFFSET R7 and X GAIN R6 potentiometers on Display Timing/Horizontal Output Printed Circuit Board 1A19 (Figure 6-1) so that the left edge of the character is just touching the left most vertical graticule line, and the last letter on the far right edge of the character is divided by the right most graticule line. See Figure 6-3.

2. Depress the BYPASS pushbutton to extinguish the corresponding LED and operate the 757 Spectrum Analyzer in the digital mode.

3. Turn on the digital calibration waveform (a full screen squarewave) by switching the WAVEFORM CAL SWITCH 1A20S1 to the ON position (Figure 6-1). The waveform should appear on the display.

4. Depress SIGNAL IN, A, and B VIEW A pushbuttons in this sequence to display the calibration waveform, and the corresponding horizontal line running through it (see Figure 6-4).

5. Adjust Y OFFSET potentiometer 1A20R41 (Figure 6-1) to center the characters vertically between the -10 and -40 graticule lines. Adjust WAVE OFFSET potentiometer 1A20R40 (Figure 6-1) to place the horizontal line that is running through the calibration waveform, on the center horizontal graticule line (-50 line). Adjust Y GAIN potentiometer 1A20R5 (Figure 6-1), such that the calibration squarewave extends 0.2 divisions past the top and bottom of the graticule line.

6. Adjust LINE OFFSET potentiometer 1A20R38 (Figure 6-1) such that the center line is as sharp and as narrow as possible.

7. Adjust LINE LENGTH potentiometer 1A20R39 (Figure 6-1) such that the vertical line joining the top and bottom of the squarewaves extend 0.2 divisions past the top and bottom of the graticule.

8. Adjust DIGITAL INTENSITY OFFSET potentiometer 1A20R42 (Figure 6-1) for identical intensity of the squarewave and the characters.

6-42. WAVEFORM ALIGNMENT.

1. Turn the WAVEFORM CAL SWITCH 1A20S1 to the OFF position (Figure 6-1).

2. Depress the BYPASS pushbutton to light the corresponding LED and disable the digital mode.

3. Set the SCAN WIDTH/DIV control to 100 MHz per division. Adjust the front panel TUNING control so that the 100 MHz combs are aligned with the vertical graticule lines.

4. Depress the BYPASS, SIGNAL IN and A pushbuttons in this sequence to enable the digital mode. If no signals appear, adjust VIDEO OFFSET 1A21R31 and VIDEO GAIN 1A21R32 potentiometers (Figure 6-1) until signals do appear.

6-43. FREQUENCY DISPERSION ADJUSTMENT.

1. Adjust RAMP OFFSET potentiometer 1A21R33 (Figure 6-1) until the left most comb line lines up to the left most graticule line. Confirm this result by depressing the BYPASS pushbutton to go back to the bypass mode, then depress it again to return to the digital mode, the 100 MHz signals should line up exactly.

2. Adjust RAMP GAIN potentiometer 1A21R30 until the other 100 MHz comb lines align with the vertical graticule line. Again, confirm this by switching out of, then into digital mode to ensure the comb lines match horizontally.

3. RAMP OFFSET and RAMP GAIN potentiometers will interact with one another, repeat steps 1 and 2.

6-44. VIDEO ADJUSTMENT.

1. Depress the BYPASS pushbutton to disable the digital mode. Set the SCAN WIDTH/DIV control to | 10 | MHz. Adjust the front panel TUNING control to align a signal with the center graticule line. Set the IF ATTEN (dB) control to 100 and adjust the vertical position control ⇕ to place the center of the noise on the -102 line.

2. Readjust the IF ATTEN (dB) control to place the peak of the signal at the -50 reference line. Set the VERT SCALE/DIV control to 5 dB per division so the signal extends from the bottom to the top of the display.

3. Depress the BYPASS pushbutton to return the system to the digital storage mode.

4. Adjust VIDEO OFFSET potentiometer 1A21R31 so that the center of the noise is on the -102 line. Adjust VIDEO GAIN potentiometer 1A21R32 so that the signal peak is at the top line of the graticule. These potentiometers interact so they must be adjusted alternately.

5. Depress the BYPASS pushbutton to disable the digital storage mode.

6. Set the SCAN WIDTH/DIV control to 100 MHz per division and align the comb lines so there is one signal per vertical graticule line.

7. Depress the BYPASS pushbutton to go to digital and bypass modes a few times, and ensure the video picture is exactly the same in both modes, both vertically and horizontally.

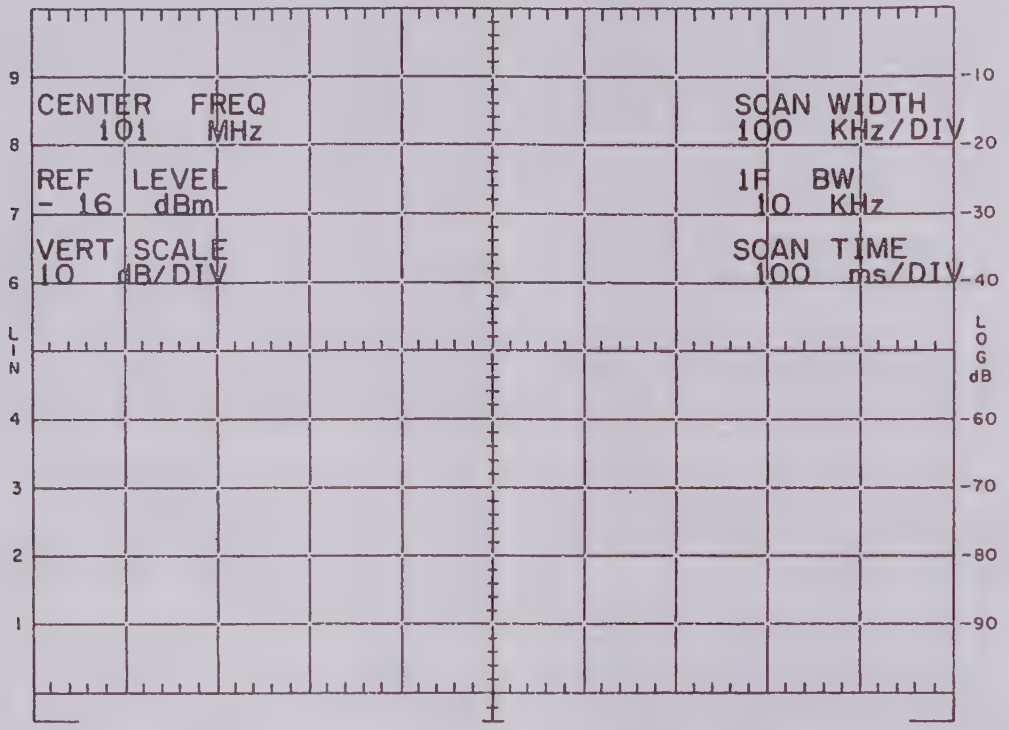

CENTER FREQ
101 MHz
REF LEVEL
- 16 dBm
VERT SCALE
10 dB/DIV
SCAN WIDTH
100 KHz/DIV
IF BW
10 KHz
SCAN TIME
100 ms/DIV
9
8
7
6
LIN
4
3
2
1
-10
-20
-30
-40
LOG dB
-60
-70
-80
-90

Figure 6-3. Test Waveform

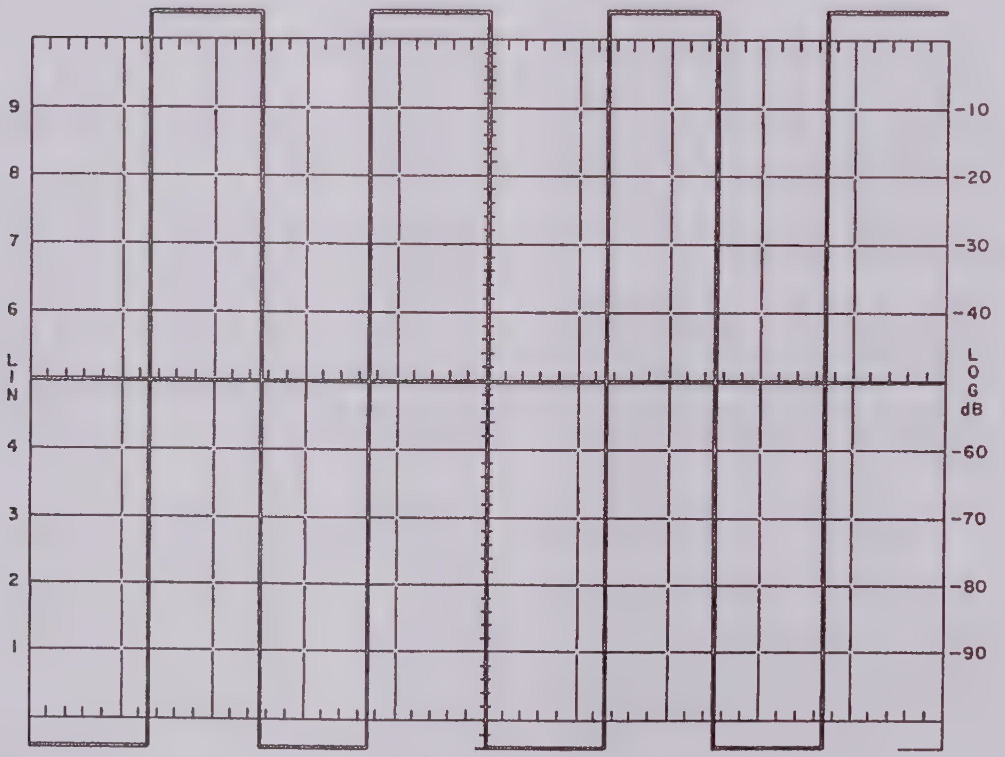


Figure 6-4. Test Waveform

SECTION 7

TROUBLESHOOTING

7-1. INTRODUCTION

7-2. This section contains instructions for isolating malfunctions to a general functional area or component of the AILTECH 757. These instructions are based on the assumption that the reader is familiar with the operating procedures for the AILTECH 757 and the test equipment required to perform these procedures. The procedures are designed for a technician who is experienced in the operation and maintenance of this or similar equipment. Included in this section, as an aid to troubleshooting, are schematic diagrams and parts location diagrams.

7-3. GENERAL INFORMATION

7-4. This section contains a functional description of some of the basic components of the AILTECH 757 circuitry. The information contained herein covers the operation of junction transistors, field effect transistors (FET), basic logic circuit elements, integrated circuits, and operational amplifiers. In order to better understand the troubleshooting procedures, it is advisable that this basic information be reviewed before proceeding.

7-5. BASIC JUNCTION TRANSISTOR. The basic junction transistor consists essentially of two PN junctions placed back to back. The transistor is a device that acts as a current amplifier. The three connections to the transistor are the emitter, the collector, and the base. The base region is generally very thin. In operation, the transistor is biased to perform its function. Biasing of the NPN type transistor is shown in Figure 7-1-A. Biasing of the PNP type transistor is shown in Figure 7-1-B.

7-6. The most common cause of transistor failure is internal short circuits or internal open circuits. To check a transistor for shorts or opens, a standard ohmmeter is used. Before checking a transistor with an ohmmeter, be sure to check that the ohmmeter is on the proper scale since most ohmmeters can supply enough current or voltage to damage a transistor. Table 7-1 lists the most commonly available types of ohmmeters and the safe scale settings of each type; these scale settings must be used to avoid damaging the transistor under test.

7-7. In addition, the ohmmeter positive and negative probes should be used only as follows:

Transistor Type	Positive Probe	Negative Probe
NPN	Base	Emitter
	Base	Collector
PNP	Collector	Base
	Emitter	Base

7-8. The physical configuration of the different types of transistors used in the AILTECH 757 are shown in Figure 7-2.

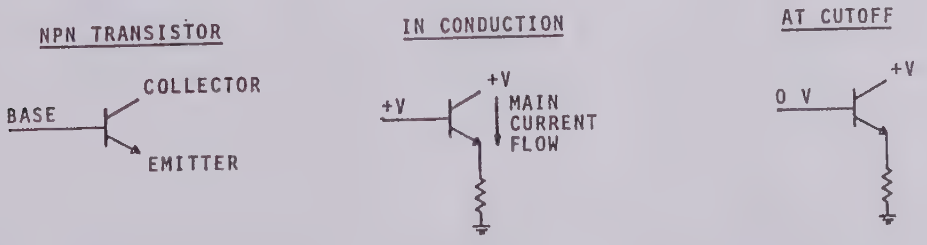


Figure 7-1-A. NPN Transistor Biasing

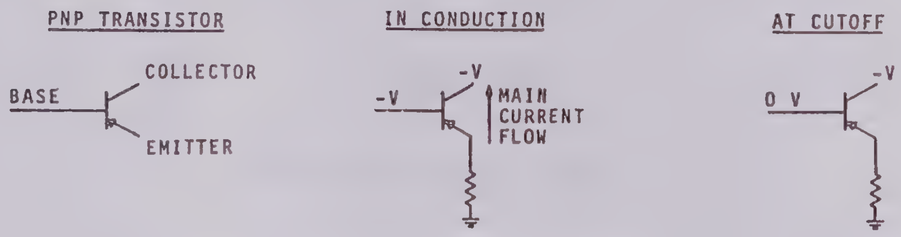

PNP TRANSISTOR
COLLECTOR
BASE
EMITTER
IN CONDUCTION
-V
-V
MAIN
CURRENT
FLOW
AT CUTOFF
-V
0 V

Figure 7-1-B. PNP Transistor Biasing

Table 7-1. Characteristics of Common Ohmmeters

Make, Model and Range	Open Circuit Voltage	Short Circuit Current	Polarity
Simpson 260			
R x 1	1.5 V	125 mA	Red +
R x 100	1.5 V	1 mA	
R x 10K	7.5 V	60 µA	Black −
Simpson 269			
R x 1	1.5 V	75 mA	
R x 10	1.5 V	8 mA	Red −
R x 100	1.5 V	8 mA	Black +
R x 1K	1.5 V	0.82 mA	
R x 10K	24 V	1.3 mA	
R x 100K	30 V	13 µA	
Triplett 630			
R x 1	1.5 V	320 mA	Red −
R x 10	1.5 V	32 mA	Black +
R x 100	1.5 V	3.25 mA	(Varies with serial number)
R x 1K	1.5 V	325 µA	
R x 100K	22.5 V	70 µA	
Triplett 310			
R x 1	1.5 V	7.5 mA	Red −
R x 10	1.5 V	750 µA	Black +
R x 100	1.5 V	75 µA	(Varies with serial number)
R x 10K	15 V	75 µA	

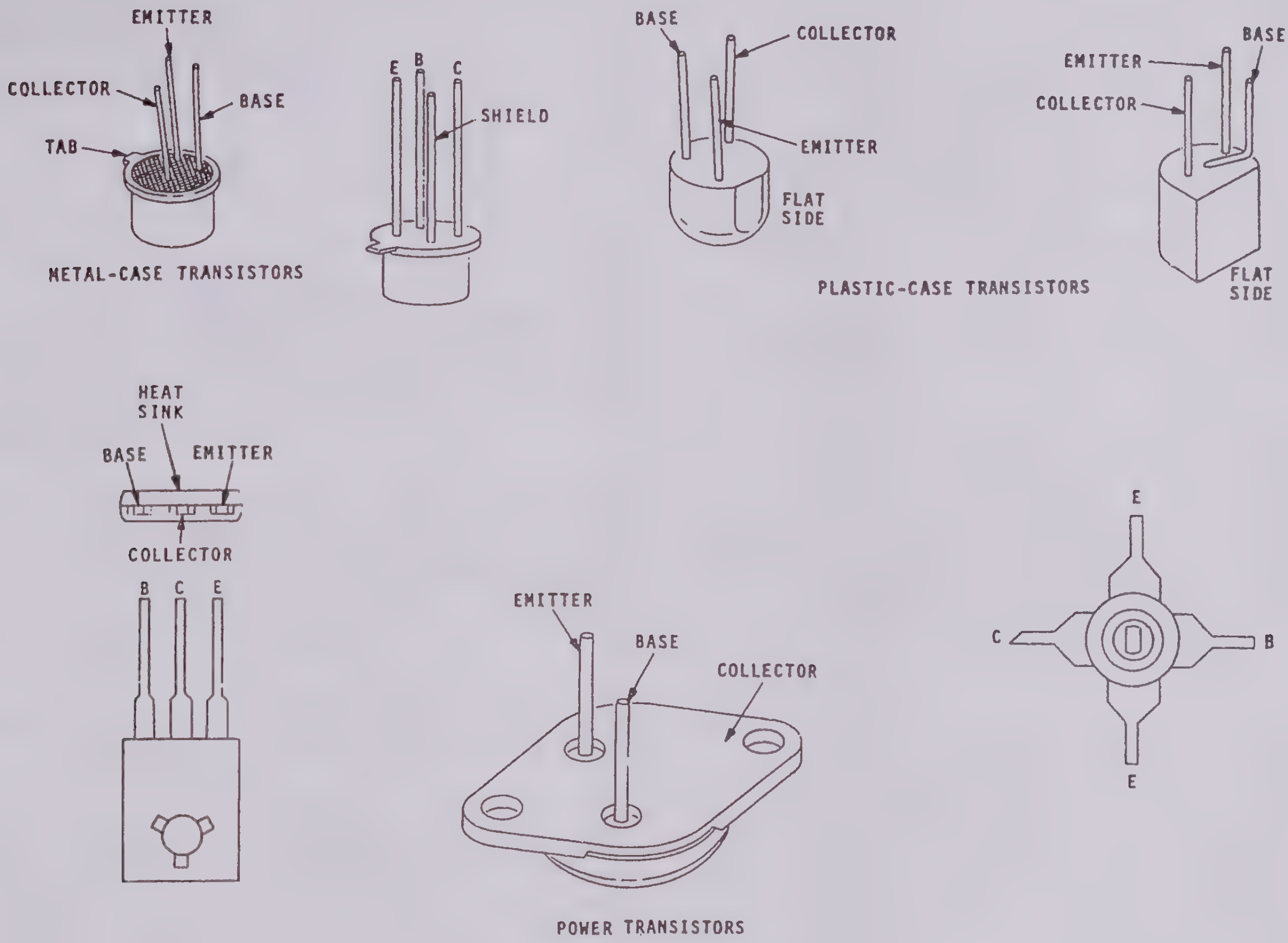
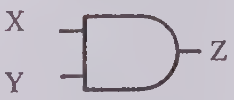

EMITTER
COLLECTOR
BASE
TAB
E B C
SHIELD
METAL-CASE TRANSISTORS
BASE
COLLECTOR
EMITTER
FLAT SIDE
EMITTER
BASE
COLLECTOR
FLAT SIDE
PLASTIC-CASE TRANSISTORS
HEAT SINK
BASE
EMITTER
COLLECTOR
B C E
EMITTER
BASE
COLLECTOR
E
C
B
E
POWER TRANSISTORS

Figure 7-2. Transistor Types

7-9. FIELD EFFECT TRANSISTOR. The field effect transistor (FET) is a voltage-sensitive device which has an extremely high input impedance. Field effect transistors have three elements: the source, the drain, the gate (Figure 7-3). The conducting path between the source and the drain is called the channel. By placing a small positive potential on an N-channel drain, electrons will flow from the source to the drain. Therefore, the current flow will be from drain to source. Varying the gate voltage will result in a variation in channel width and resistance. Thus, it is the gate voltage variation that causes a change in the current drain, making the FET a voltage-sensitive device.

7-10. BASIC LOGIC ELEMENTS. The two most basic forms of logic elements are the AND and OR gates. These are shown with their respective truth tables.

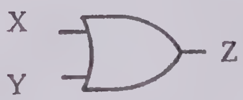
AND



$Z = X \cdot Y$

X	Y	Z
H	H	H
H	L	L
L	H	L
L	L	L

OR



$Z = X + Y$

X	Y	Z
H	H	H
H	L	H
L	H	H
L	L	L

7-11. A NAND gate is an AND gate with its output inverted. Similarly, an OR gate becomes a NOR gate when its output is inverted. The same effect

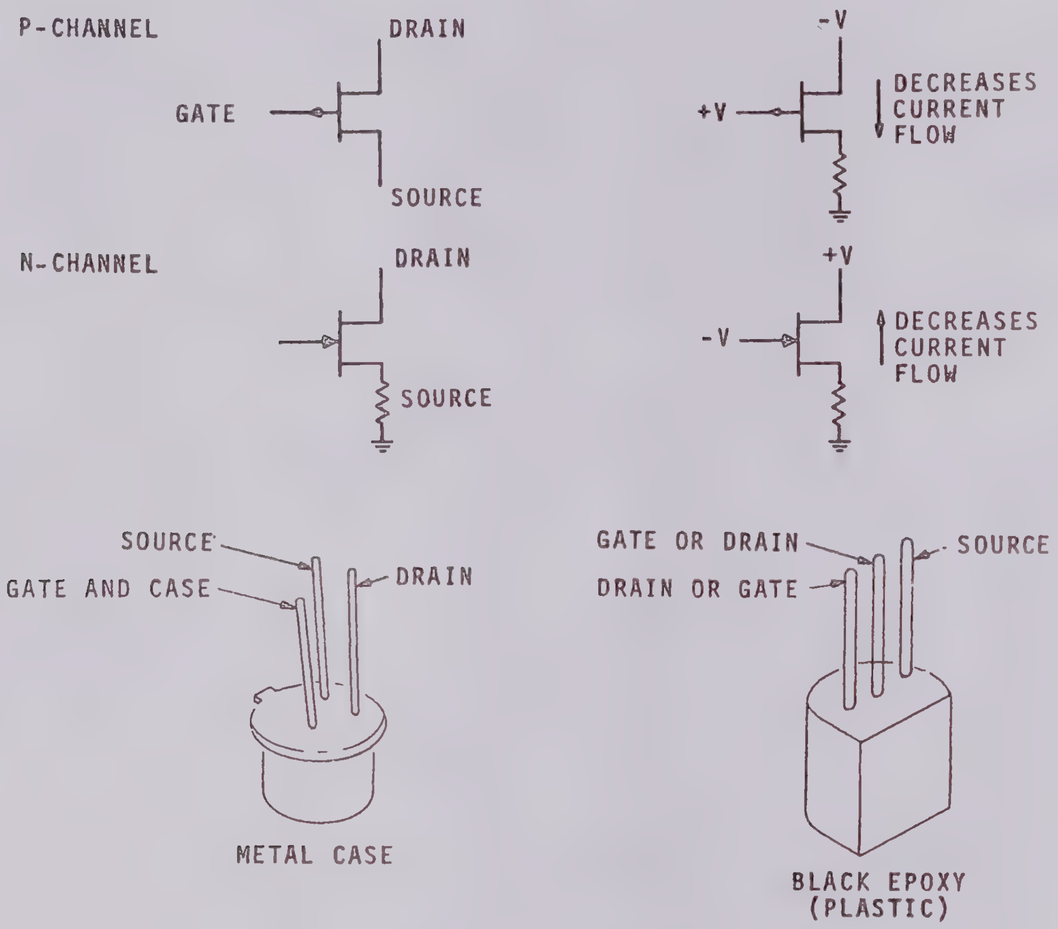
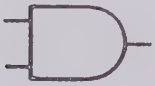
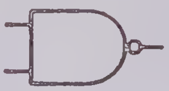

P-CHANNEL
DRAIN
GATE
SOURCE
-V
+V
DECREASES CURRENT FLOW
N-CHANNEL
DRAIN
SOURCE
+V
-V
DECREASES CURRENT FLOW
SOURCE
GATE AND CASE
DRAIN
METAL CASE
GATE OR DRAIN
DRAIN OR GATE
SOURCE
BLACK EPOXY (PLASTIC)

Figure 7-3. FET Biasing

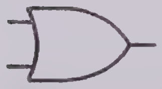
can be accomplished by inverting the inputs of each. To illustrate inversion or the input or output levels schematically, a circle is added to the appropriate line. For example:

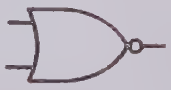
AND Becomes NAND (NOT AND)





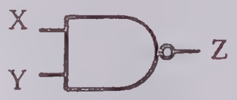
OR Becomes NOR (NOT OR)





7-12. Typical NAND and NOR gates are shown below with their respective truth tables.

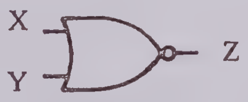
NAND



$Z = \overline{X \cdot Y}$

X	Y	Z
H	H	L
H	L	H
L	H	H
L	L	H

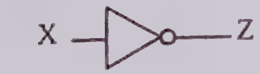
NOR



$Z = \overline{X + Y}$

X	Y	Z
H	H	L
H	L	L
L	H	L
L	L	H

7-13. An inverter performs a logic level inversion of its input signal. A one-input inverter is shown below with its truth table.



X	Z
H	L
L	H

7-14. INTEGRATED CIRCUITS. Basic logic gates are grouped in various combinations to form integrated circuit chips. Figure 7-4 shows the physical configuration of some typical integrated circuit chips used in the AILTECH 757.

7-15. OPERATIONAL AMPLIFIERS. Operational amplifiers are used to implement several functions. They are used as summers, regulators, buffers, amplifiers, integrators, and offset amplifiers. Figure 7-5 shows some general examples of the use of operational amplifiers.

7-16. TROUBLESHOOTING INDEX (TABLE 7-2) AND WIRE RUN LISTS (TABLE 7-4)

7-17. Table 7-2 provides an index of troubleshooting procedures and circuit descriptions for components of the AILTECH 757 Spectrum Analyzer. Included in this table are references to maintenance schematic diagrams and component location diagrams. This table should be used to locate the paragraph number for troubleshooting and the circuit descriptions of components. Table 7-4 provides the internal wiring information for troubleshooting the 757 Spectrum Analyzer.

7-18. MAINTENANCE TURN-ON PROCEDURE

7-19. Refer to paragraph 4-8 for instructions that are required before troubleshooting the AILTECH 757 Spectrum Analyzer.

7-20. TROUBLESHOOTING PROCEDURES

7-21. SWITCH ASSEMBLIES. Troubleshooting of the switch assemblies for the 757 Spectrum Analyzer can be accomplished by referring to the maintenance schematic diagrams and using conventional troubleshooting techniques. The following is a list of the switch assemblies and their corresponding maintenance schematic diagrams.

Switch	Figure No.
Front Panel Assembly 1A2	7-6
SCAN WIDTH/DIV Switch 1A2A1	7-7
SCAN TIME/DIV Switch 1A2A2	7-8
RF RANGE (GHz) Switch 1A2A3	7-9
IF BANDWIDTH (KHz) Switch 1A2A4	7-10
VERT SCALE/DIV Switch 1A2A5	7-11
SCAN MODE Switch 1A2A6	7-12

7-22. BANDWIDTH PRINTED CIRCUIT BOARD 1A2A8. (See Figure 7-13.)

7-23. Circuit Description. The bandwidth printed circuit board contains FREQ/TIME DOMAIN switch S1, seven light emitting diodes (LEDs), CR1 through CR3 and CR8 through CR11. LEDs CR8 through CR11 indicate which IF filter is energized and CR3 is the UNCAL indicator. LEDs CR1 and CR2 are the FREQ and TIME indicators.

7-24. Troubleshooting. Troubleshooting of this board is accomplished by removing the connector J1 and, using an ohmmeter, checking switch S1 for continuity and diodes CR4 through CR7 for standard diode action. The LEDs can be checked by energizing connector J1-3 with +5 Vdc and grounding the respective output to see if the LED illuminates.

7-25. PUSHBUTTON SWITCH ASSEMBLY 1A2A9. (See Figure 7-14.)

7-26. Circuit Description. Pushbutton Switch Assembly 1A2A9 consists of two circuits; the switch assembly consisting of switches S1 through S5 and the LEDs consisting of CR1 through CR5. The digital commands, SIGNAL IN, HOLD, RECALL, SIG IN-MEMORY, and BYPASS, light their corresponding LEDs, when the corresponding switch is closed.

7-27. Troubleshooting. Troubleshooting is accomplished by checking switches S1 through S5 with an ohmmeter. The LEDs can be checked by supplying connector J1 pin 2 with +5 Vdc and grounding the appropriate output. This will ensure that the LEDs are illuminating.

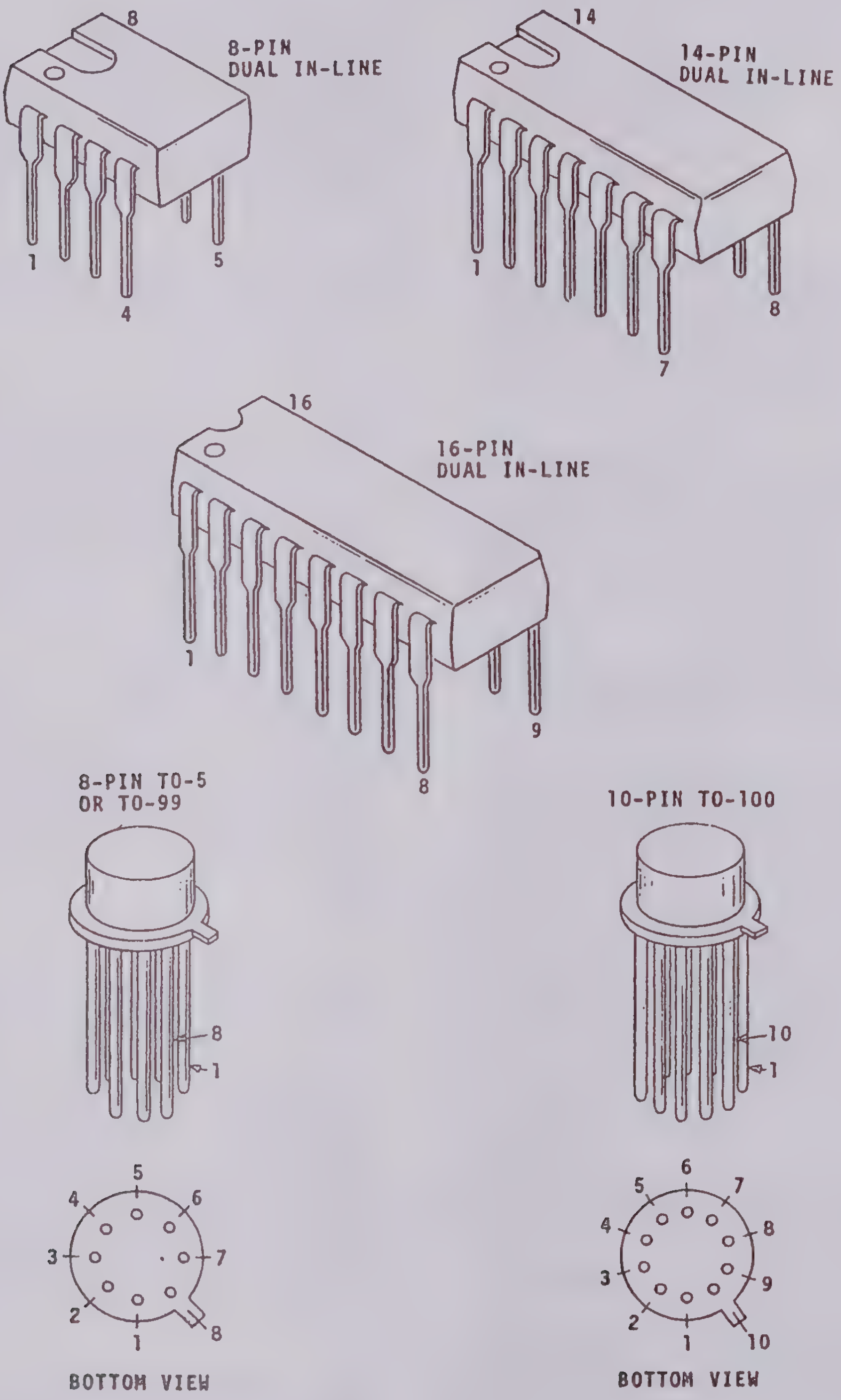
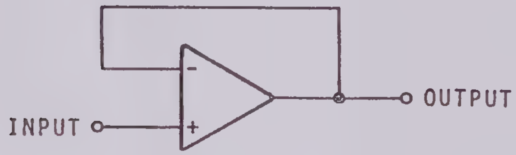
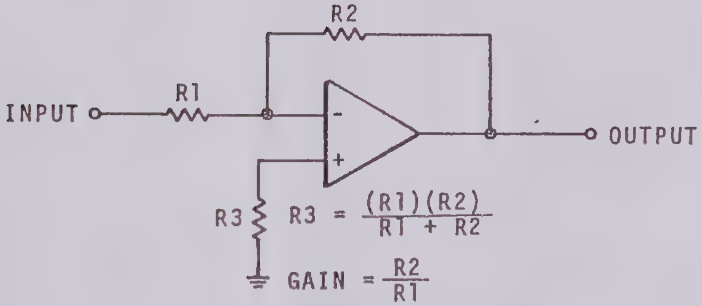

8
8-PIN
DUAL IN-LINE
1
5
4
14
14-PIN
DUAL IN-LINE
1
8
7
16
16-PIN
DUAL IN-LINE
1
9
8
8-PIN TO-5
OR TO-99
8
1
5
4
6
3
7
2
1
8
BOTTOM VIEW
10-PIN TO-100
10
1
6
5
7
4
8
3
9
2
1
10
BOTTOM VIEW

Figure 7-4. Integrated Circuit Chips


INPUT
OUTPUT
-
+

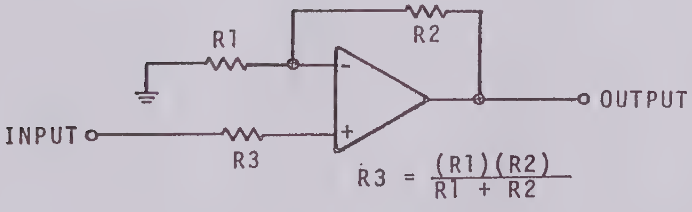
UNITY GAIN VOLTAGE FOLLOWER
HIGH INPUT IMPEDANCE
LOW OUTPUT IMPEDANCE


R2
R1
INPUT
OUTPUT
-
+
R3

$$R3 = \frac{(R1)(R2)}{R1 + R2}$$

$$GAIN = \frac{R2}{R1}$$

INVERTING AMPLIFIER
LOW OUTPUT IMPEDANCE
R1 IS INPUT IMPEDANCE


R1
R2
INPUT
OUTPUT
R3
-
+

$$R3 = \frac{(R1)(R2)}{R1 + R2}$$

$$GAIN = \frac{R2}{R1} + 1$$

NONINVERTING AMPLIFIER
LOW OUTPUT IMPEDANCE
HIGH INPUT IMPEDANCE

Figure 7-5. Typical Applications of Operational Amplifiers

Table 7-2. Troubleshooting Index

Reference Designation	Component	Troubleshooting Paragraph	Circuit Description Paragraph	Maintenance Schematic Fig. No.	Component Location Fig. No.
1A2	Front panel	N/A	N/A	N/A	7-6
1A2A1	SCAN WIDTH switch	7-21	N/A	7-7	7-6
1A2A2	SCAN TIME switch	7-21	N/A	7-8	7-6
1A2A3	RF RANGE switch	7-21	N/A	7-9	7-9
1A2A4	IF BANDWIDTH switch	7-21	N/A	7-10	7-6
1A2A5	VERTICAL SCALE switch	7-21	N/A	7-11	7-6
1A2A6	SCAN MODE switch	7-21	N/A	7-12	7-6
1A2A7	CALIBRATE indicator	N/A	N/A	N/A	7-6
1A2A8	Bandwidth printed circuit board	7-24	7-23	7-13	7-6
1A2A9	Pushbutton switch	7-27	7-26	7-14	7-6
1A2A10	Pushbutton switch	7-30	7-29	7-15	7-15
1A2A11	Frequency readout printed circuit board	7-33	7-32	7-16	7-16
1A2A12	Tuner assembly	7-36	7-35	7-17	7-17
1A2A13	IF attenuator	7-48	N/A	N/A	7-18
1A2A14	RF attenuator	N/A	N/A	N/A	7-19
1A2A15	Signal center assembly	N/A	N/A	N/A	7-6
1A2A16	Baseline/Contrast assembly	N/A	N/A	N/A	7-6
1A2A17	Control panel	N/A	N/A	N/A	7-6
1A2A18	RF switch	N/A	N/A	N/A	7-6
1A3	Rear panel	N/A	N/A	N/A	3-2
1A4	Low voltage power supply	7-40	7-38	7-20	7-20
1A5	CRT display	(Refer to Section 9)			
1A6	Absolute power board	7-44	7-42	7-21	7-21
1A7	Fixed attenuator	N/A	N/A	N/A	N/A
1A8	Log IF amplifier	7-47	7-46	7-22	7-22
1A8A1	Log IF amplifier printed circuit board	7-47	7-46	7-22	7-22
1A9	Comb generator	N/A	N/A	N/A	N/A
1A10	RF/IF assembly	–	–	–	7-23
1A10A1	IF processor	7-48, 7-57	7-56	N/A	7-24
1A10A1A1	IF processor printed circuit board	7-57	7-56	7-24	7-24
1A10A1A2	IF filter	7-54	7-53	7-25	7-24, 7-25
1A10A1A3	IF filter	7-54	7-53	7-25	7-24, 7-25
1A10A1A4	Second IF converter	7-51	7-50	7-26	7-24, 7-26
1A10A1A5	IF amplifier	7-51	7-50	7-26	7-24, 7-26
1A10A2	Yig oscillator	N/A	N/A	N/A	7-23
1A10A3	Yig filter	N/A	N/A	N/A	7-23
1A10A4	Mixer bias	7-48, 7-70	7-69	7-29	7-29
1A10A5	Loop control	7-71	N/A	N/A	7-30
1A10A5A1	Loop control printed circuit board	7-71	7-79	7-30	7-30
1A10A5A2	3.5 MHz oscillator printed circuit board	7-74	–	7-31	7-31
1A10A5A3	Comb source printed circuit board	7-77	7-76	7-31	7-31

Table 7-2. Troubleshooting Index (Continued)

Reference Designation	Component	Troubleshooting Paragraph	Circuit Description Paragraph	Maintenance Schematic Fig. No.	Component Location Fig. No.
1A10A5A4	100 MHz oscillator printed circuit board	7-83	7-82	7-31	7-31
1A10A6	Local oscillator	7-58	–	7-27	7-27
1A10A6A1	LCVCO shaper printed circuit board	7-61	7-60	7-27	7-27
1A10A6A2	LCVCO oscillator printed circuit board	7-64	7-63	7-27	7-27
1A10A7	RF switch	N/A	N/A	N/A	7-23
1A10A8	RF switch	N/A	N/A	N/A	7-23
1A10A9	RF switch	N/A	N/A	N/A	7-23
1A10A10	RF switch	N/A	N/A	N/A	7-23
1A10A11	Low pass filter	N/A	N/A	N/A	7-23
1A10A12	Yig driver printed circuit board	7-88	7-85	7-32	7-32
1A10A13	Microwave mixer	N/A	N/A	N/A	7-23
1A10A14	Fixed attenuator	N/A	N/A	N/A	7-23
1A10A15	Fixed attenuator	N/A	N/A	N/A	7-23
1A10A16	6 dB coupler	N/A	N/A	N/A	7-23
1A10A17	Harmonic mixer	N/A	N/A	N/A	7-23
1A10A18	RF amplifier	7-48, 7-67	7-66	7-28	7-28
1A10A19	6 dB coupler	N/A	N/A	N/A	7-23
1A10A20	227 MHz bandpass filter	7-48	N/A	N/A	7-23
1A10A21	40 dB isolator	N/A	N/A	N/A	7-23
1A10A22	Fixed attenuator	7-48	N/A	N/A	7-23
1A10A23	Loop mixer	N/A	N/A	N/A	7-23
1A10A24	Comb generator	N/A	N/A	N/A	7-23
1A10A25	Fixed attenuator	N/A	N/A	N/A	7-23
1A10A26	2060 MHz oscillator	N/A	N/A	N/A	7-23
1A10A27	Not used	N/A	N/A	N/A	N/A
1A10A28	Not used	N/A	N/A	N/A	N/A
1A10A29	RF switch	7-48	N/A	N/A	7-23
1A10A30	RF switch	7-48	N/A	N/A	7-23
1A10A31	RF amplifier	7-48, 7-67	7-66	7-28	7-28
1A10A32	Yig driver heat sink	7-88	7-85	7-32	7-32
1A10A33	RF switch	N/A	N/A	N/A	7-23
1A10A34	RF switch	N/A	N/A	N/A	7-23
1A10A35	6 dB coupler	N/A	N/A	N/A	7-23
1A11	Sweep generator printed circuit board	7-96	7-90	7-33	7-33
1A12	Processed video printed circuit board	7-101	7-98	7-34	7-34
1A13	Regulator bias printed circuit board	7-108	7-103	7-35	7-35
1A14	Digital display printed circuit board No. 1	7-111	7-110	7-36	7-36
1A15	Digital display printed circuit board No. 2	7-114	7-113	7-37	7-37

Table 7-2. Troubleshooting Index (Continued)

Reference Designation	Component	Troubleshooting Paragraph	Circuit Description Paragraph	Maintenance Schematic Fig. No.	Component Location Fig. No.
1A16	Frequency and power reference encoder printed circuit board	7-115	7-116	7-38	7-38
1A17	Character generator and data encoder printed circuit board	7-115	7-126	7-39	7-39
1A18	Horizontal timing printed circuit board	7-115	7-143	7-40	7-40
1A19	Display timing and horizontal output printed circuit board	7-115	7-151	7-41	7-41
1A20	Pushbutton interface and line generator printed circuit board	7-115	7-159	7-42	7-42
1A21	Data digitizer and memory logic printed circuit board	7-115	7-181	7-43	7-43

7-28. PUSHBUTTON SWITCH ASSEMBLY 1A2A10. (See Figure 7-15.)

7-29. Circuit Description. Pushbutton switch assembly 1A2A10 consists of three separate circuits. The switch circuit consisting of switches S1 through S4 supplies the closures for four of the digital functions of the normalizer. These pushbuttons are A, B VIEW A, SAVE, and READOUT DISABLE. In addition, the switch has four LEDs, CR1 through CR4, which are energized when any of the preceding pushbuttons are enabled. The last circuit is the filter network consisting of capacitors C1 through C4 and resistors R5 and R6. This filter network is used for remote sensing of the ±6 Vdc reference. In addition, this board is used as a tie point for remote tuning and the input to Tuner Assembly 1A2A12.

7-30. Troubleshooting. To troubleshoot Pushbutton Switch Assembly 1A2A10, proceed as follows:

1. Remove connectors J1, J2 and J3.

2. Using an ohmmeter, check to see if switches S1 through S4 are operating properly.

3. Check the LEDs by applying +5 Vdc to connector J1 pin 2, and grounding pins 7, 8, 9 and 10 of connector J1. This should illuminate the LEDs and verify that they are functional.

4. Monitor the filter network by checking capacitors C1 through C4 for shorts. If the capacitors do not appear to be shorted, apply a voltage into the input of the network and verify that it is producing a filtered output.

7-31. FREQUENCY READOUT PRINTED CIRCUIT BOARD 1A2A11. (See Figure 7-16.)

7-32. Circuit Description. Frequency Readout Printed Circuit Board 1A2A11, is part of the front panel assembly and contains five, 7 segment LEDs (Z1 through Z5) indicating the center frequency of the 757 Spectrum Analyzer.

7-33. Troubleshooting. Troubleshooting of the frequency readout printed circuit board is accomplished by interchanging any LED that does not read with one that does. An oscilloscope can be used to check for the appropriate voltage levels for the segment that is enabled.

7-34. TUNER ASSEMBLY 1A2A12. (See Figure 7-17.)

7-35. Circuit Description. Tuner Assembly 1A2A12 consists of two 5K ten-turn precision potentiometers, R1 and R2, which are sequentially energized as a function of the SCAN WIDTH/DIV switch. For scan widths of 700 MHz/div to 1 MHz/div, coarse tune potentiometer R1 is energized.

This is done by energizing clutch 1 (CL1) with +24 Vdc. As the tuning control is rotated, both the coarse tune and fine tune clutches rotate. The fine tune clutch turns at a 5:1 reduced rate. When the SCAN WIDTH/DIV switch is set to 300 KHz/div or less, the +24 Vdc is switched to the fine tune clutch, CL2, so that the fine tune now becomes the control for the Spectrum Analyzer. As the SCAN WIDTH/DIV switch is increased from 300 KHz/div to 1 MHz/div, coarse tune clutch CL1 is again energized and a spring loaded recoil mechanism resets fine tuning clutch CL2 and potentiometer R2 to the center of its range.

7-36. Troubleshooting. To troubleshoot the tuner assembly proceed as follows:

1. Energize CL1 with +24 Vdc. Verify that the clutch is being energized and pulled in. If the clutch will not pull in, check diodes CR1 and CR2 to verify that they are not shorted. If it is energized but not pulling in, check to see that the spacing is 0.010 inches between clutch and clutch plate.

2. Vary the TUNING control and check that potentiometer R1 is changing properly and that the voltage on the wiper of the coarse tune (larger) potentiometer R1 is changing.

3. Energize CL2 with +24 Vdc. Repeat step 2 for fine tuning potentiometer R2. Vary the TUNING control until potentiometer R2 no longer turns.

4. Remove the voltage from CL2. The recoil mechanism should rewind again, centering the fine tune potentiometer. If it does not rewind, verify that the nylon line is not being fouled and that the spring is seated properly in its nylon bushing.

7-37. LOW VOLTAGE POWER SUPPLY 1A4. (See Figure 7-20.)

7-38. Circuit Description. Low Voltage Power Supply 1A4 provides the four dc voltages for the system. These voltages are +18.3 Vdc at 2.0 amps full load, -18.3 Vdc at 2.5 amps full load, +5 Vdc at 4.0 amps full load and +24 Vdc at 1 amp full load. All outputs are overload protected, and there is an interlock to shut down -18 Vdc if +18 Vdc fails. The supply is provided with a thermal cutout switch (S1) which provides protection from overheating and is capable of taking an input of 115 Vac or 230 Vac at a frequency of 47 to 400 Hz. The supply also provides outputs of 115 Vac at 200 mA and 8 Vac at 5 mA. The 8 Vac output is used for LINE sync.

7-39. The ac input voltage is applied to the primary of transformer T1 and comes out on six secondary windings. The voltages are then rectified by a series of diode bridges and fed into regulators Z1 through Z4. The voltages are adjusted by varying potentiometers R11, R25, R39, and R53. The overcurrent protect circuits are set by adjusting potentiometers R14, R28, R42, and R56. Current limit integrated circuits Z5 through Z8 are used in this circuit in conjunction with SCRs VR1 through VR4 to provide the foldback points. Pass transistors Q1, Q3, Q4 and Q5, which are in a darlington pair are located on a heat sink, which is mounted to the rear panel.

7-40. Troubleshooting. (Consult Factory)

7-41. ABSOLUTE POWER PRINTED CIRCUIT BOARD 1A6. (See Figure 7-21.)

7-42. Circuit Description. Absolute Power Printed Circuit Board 1A6 provides a 2½ digit alphanumeric readout of the power in dBm at the REF line of the CRT. This reference is set for the 0 dB graticule line. Its operation ensures that all combinations of the RF and IF attenuators are accurately tracked to ±1 dB. The absolute value of the reference line remains unchanged when the unit is expanded about the REF position. When expanding about the NOISE, or when the PRESELECTOR switch is set to the OUT position, the readout is intentionally blanked. For analyzers that have the high sensitivity preamplifiers (Option 001) installed, a 20 dB correction factor is automatically inserted into the readout when the RF RANGE (GHz) switch is placed in the .001 – 2.0 GHz position.

7-43. The input of the board consists of a switched ground which indicates the position of the RF and IF attenuators. These inputs are normally held high through a 5.1K pull up resistor. In the case of the IF attenuator, the tens and ones are processed through a 10 line to 4 line binary to BCD converter U2 while the RF attenuator is converted through diode logic. These outputs are gated through inverters U3 and U4 into a 4-bit magnitude comparator and summer U5. The magnitude comparator compares these outputs to a preset input which is generated by a BCD switch on the board for the 10 dB steps. For the 1 dB steps the AMPL ADJ control generates the preset. The outputs are then multiplexed and added or subtracted as needed. The sign and hundreds bits are obtained by a series of NAND and NOR gates to give the final result.

7-44. Troubleshooting. Troubleshooting the absolute power board involves observing the levels of TTL logic. The inputs from the RF and IF attenuators are at a logic high. Whichever position the attenuator switch is in, it supplies a ground or logic low. The signals are applied to the 10 line to 4 line BCD encoder. These outputs are then converted and summed with the BCD offset that comes from the front panel AMPL ADJ control, or from 10's BCD preset switch S1 located on the board. The outputs are then applied to the ones or tens arithmetic decoder and a 4-bit magnitude comparator. The output of the decoders is then fed into the subtractors and into the sign overflow logic.

7-45. LOG IF AMPLIFIER ASSEMBLY 1A8. (See Figure 7-22.)

7-46. Circuit Description. Log IF Amplifier Assembly 1A8 consists of 9 bipolar monolithic integrated circuit wideband amplifiers Z1 through Z9 used in a successive detection scheme. The mid-band voltage gain of each of the individual amplifiers that make up the amplifier is approximately 12 dB. The circuit is broken down into two chains. The main chain, which consists of seven stages (Z3 through Z9), provides a dynamic range of approximately 85 dB. This is then raised to approximately 110 dB by the addition of the second two stage chain (Z1 and Z2). Two transistor buffer stages (Q1 and Q2) are used in the output summing line to reduce spurious feedback and lower the output rise time. Seven interstage filters are inserted to reduce the noise and maintain unity voltage transfer at resonance. This serves not to distort the logarithmic law.

7-47. Troubleshooting. The log IF amplifier consists of 9 stages of amplification and should be troubleshot as follows:

1. Inject a 10 dBm signal centered at 21.4 MHz into IF input connector J1.

2. Vary the IF ATTEN (dB) control until the signal sits on the top graticule line. It may be necessary to vary the signal level input in order to achieve this.

3. Decrease the IF ATTEN (dB) control in 10 dB steps.

4. The signal should drop 10 dB for each 10 dB step of the attenuator. If the unit does not track with the attenuator, Z1 through Z9 should be replaced one at a time, starting from the input, until the unit tracks with the attenuator. Inductor L2 may have to be increased or decreased in length. The complexity of this process necessitates that the unit be returned to the factory for qualified repair and calibration, if possible.

7-48. IF SECTION. (See Figures 7-23 through 7-26.) The IF section consists of IF Processor Assembly 1A10A1, Mixer Bias Assembly 1A10A4, two RF amplifiers 1A10A18 and 1A10A31, 227 MHz bandpass filter 1A10A20, fixed attenuator 1A10A22, RF switches 1A10A29 and 1A10A30, and IF attenuator 1A2A13. To troubleshoot the IF section, proceed as follows:

1. Check for a 248 MHz output from LCVCO oscillator 1A10A6A2 on the coupled down port J1. Approximate power should be between -5 and 0 dBm at 248 MHz.

2. Using a signal generator, inject 227 MHz into the RF input connector J5 of IF assembly 1A10A1. The signal should be peaked up to verify that the signal generator is putting out 227 MHz. This can be done by putting in approximately -30 dBm of signal, and adjusting the timing control of the signal generator until the signal is peaked on the display of the Spectrum Analyzer.

3. In order to measure the IF sensitivity, reduce the signal level until it is below the noise, (approximately -110 dBm), then increase the signal until there is a 2 dB signal-to-noise ratio or the signal raises by 2 dB above the noise. The sensitivity should be approximately -97 dB. It should take a -23 dBm signal to reach the top of the screen when the IF section is operating properly.

4. If the sensitivity is correct, the problem is located between the 227 MHz input of IF Processor Assembly 1A10A1 and the RF to IF conversion at the output of Mixer Bias Assembly 1A10A4. However, if the signal is not correct at this point, it will be necessary to continue to make measurements through the IF strip.

5. Inject a 21.4 MHz signal into the input of the IF processor 1A10A1A1 by removing the cable that is on the processor and injecting the signal into cable W32. This is done in order to obtain a 2 dB signal-to-noise ratio. The sensitivity at this point should be approximately 103 dB. If the IF Processor Assembly 1A10A1 is operating properly a signal of -28 dBm should move the signal to the top of the display. If the sensitivity is not accurate at this point the problem is isolated into the specific section of the IF chain. The IF Processor Assembly 1A10A1 can now be broken down into two major sections. Mixer bias 1A10A4, first IF amplifier 1A10A1A5, and first filter bank 1A10A1A3, make up the first major section. IF processor 1A10A1A1 and second filter bank 1A10A1A2 make up the second major section.

6. To verify further that the problem is in the IF Processor Assembly 1A10A1, remove cable W41 that connects the processor output, and with no attenuation on the IF attenuator, inject a 21.4 MHz signal into the cable. Inject 21.4 MHz at this point. The sensitivity should be approximately -100 dBm and it should take approximately a +2 dBm signal to get to the top of the display. (Front panel to rear panel gain is approximately 20 dB.)

7-49. SECOND IF CONVERTER 1A10A1A4 AND IF AMPLIFIER 1A10A1A5. (See Figure 7-26.)

7-50. Circuit Description. The second IF converter and IF amplifier consists of a balanced mixer 1A10A1A4 and amplifier 1A10A1A5. This circuit converts the 227 MHz IF (RF) and 248 MHz LO into a 21.4 MHz IF signal. The mixer, which has a conversion loss of approximately 6 dB, takes the 248 MHz and 227 MHz and converts it down to 21.4 MHz. This signal is processed through a filter network and is applied to the base of transistor Q1, where it is amplified. The gain of this amplifier is approximately 20 dB. The circuit is tuned for maximum gain by the adjustment of capacitor C10. The adjustment of potentiometer, R3, in the emitter of Q1 sets the overall IF gain at system level such that 0 dBm will be at the top of the screen.

7-51. Troubleshooting. Troubleshooting of the second IF converter and IF amplifier consists of signal injections and tracing of the signal along the RF path.

1. Verify that the 248 MHz LO and 227 MHz RF are being applied to mixer M1.

2. Using another spectrum analyzer, verify that 21.4 MHz is being outputted from the mixer and applied to the amplifier.

3. Using another spectrum analyzer with an ac coupled scope probe, signal trace the 21.4 MHz signal through amplifier 1A10A1A5.

4. Verify that ±18 Vdc is being applied to the amplifier and that capacitors C10 and C11 are not open or shorted. Check for any burnt components around transistor Q1.

7-52. IF FILTERS 1A10A1A2 AND 1A10A1A3. (See Figures 7-24 and 7-25.)

7-53. Circuit Description. The IF filters each consist of four filters. The 1 MHz filter is a lumped LC type, while the 100, 10 and 1 KHz filters are crystal filters (A3, A2, and A1, respectively). These crystal filters are cascaded with a second bank of filters in IF assembly 1A10A1. The circuit consists of a series of diode switches, CR1 through CR16, which are energized by the +18 Vdc power source. When energized, the line allows the 21.4 MHz signal to pass through the diodes and into the filter for processing. The 1 MHz filter consists of a series of variable inductors (L23, L24 and L25) which are adjusted for the filters final bandpass characteristics. In addition, the individual filters insertion loss can be varied such that the peak of each filter in the system is the same.

7-54. Troubleshooting. Troubleshooting of the IF filters should be done at a system level. The only active components are the diode switches CR1 – 16. Verify that the diodes are not open and are being switched properly. If all the diodes appear to be functioning, signal trace through the section to determine the defective component. Refer to paragraph 7-48 for fault isolation of filter banks.

7-55. IF PROCESSOR 1A10A1A1. (See Figures 7-24 through 7-26.)

7-56. Circuit Description. The IF processor consists of two stages of amplification along with five voltage stepped attenuators (VSA). The 21.4 MHz signal is applied to the IF processor from IF filter bank 1A10A1A3 at E1 and is processed through one stage of amplification. This is tuned by varying capacitor C6. The signal is then processed through a diode switch into a resistor attenuator, which is energized by +18 Vdc as a function of the frequency band selected. The band 4 section is effectively a short circuit and has the lowest gain. Therefore, it is used as a comparison for all of the other bands and all are adjusted relative to band 4. After being processed through the switches, the signal is amplified once again. The second stage is peaked by varying capacitor C34.

7-57. Troubleshooting. Troubleshooting of the IF processor is accomplished by signal tracing.

1. Inject a -30 dBm signal at 21.4 MHz into processor input E1.

2. Using another spectrum analyzer, which is ac coupled, check for an output of 21.4 MHz at approximately -10 dBm at the junction of capacitors C19 and C36. It may be necessary to vary capacitor C6 in order to achieve the power required.

3. Energize the band 4 select line with +18 Vdc (set RF RANGE (GHz) switch to 5.4 to 12.4). Verify that +18 Vdc is being applied to the diode switch (CR9 and CR10) and that the diode switch is turned on.

4. Reduce the input test signal to -50 dBm. Check the processor output at E2 for a 21.4 MHz signal at approximately -10 dBm. It may be necessary to adjust capacitors C34 and C6 to achieve this.

7-58. LOCAL OSCILLATOR 1A10A6. Local Oscillator 1A10A6 (Figure 7-27) consists of two main sections: LCVCO shaper 1A10A6A1 and LCVCO oscillator 1A10A6A2. The shaper has a +18 volt source that is regulated down to +6.2 volts. This voltage is applied to LCVCO oscillator 1A10A6A2. The voltages can be monitored on test points TP1, TP2, and TP3. On test point TP1, the voltage should be +17.0 volts. The second test point (TP2), should have a voltage of approximately -14 volts. The third test point (TP3) should have a sweep when the SCAN WIDTH/DIV switch is set at 300 KHz or less. The differential voltage on any of the test points should be in the order of 40 microvolts. This is with no sweep signal being applied to the LCVCO sweep control circuit. To verify that there is no problem and that 40 microvolts is present on all three test points, first remove the sweep connection from the input at E11. Now the measurement of the 40 microvolts at any of the three test points can be verified. If there is more than a 40 microvolt shift, on any of these three test points, including the positive terminal of capacitor C1, then there is a defective operational amplifier which should be removed. At test point TP1, if the shift is more than 40 microvolts remove operational amplifier Z1. At test point TP2, if the shift is more than 40 microvolts, remove operational amplifier Z2. And, finally, if there is more than a 40 microvolt shift at test point TP3, remove operational amplifier Z3. If the spectrum appears noisy and is low in amplitude, one of the operational amplifiers is oscillating. Adjusting feedback capacitor, C1, on the oscillator board should suppress this oscillation by raising the power of the oscillator to maximum. To prevent excess FMing, replace any noise potentiometers and/or diodes on shaper board 1A10A6A1. The standard voltages on the test points, without the sweep being applied to oscillator 1A10A6A2 are +16.7 to +17.2 for test point TP1, and -14 to -15.3 for test point TP2. The voltage on sweep test point TP3 will be -9.75 to -10.25 volts. All voltages are obtained with the sweep input wire removed from LCVCO 1A10A6. With all wires connected and the desired output signal being monitored, refer to Section 6 to verify that the shaper is operating properly. When the circuit is operating properly, a -5 to 0 dBm signal at a frequency of 248 MHz will be on the test port. When a 1 MHz comb line is injected into the 227 MHz bandpass filter 1A10A20, comb lines will be visible every 3-1/3 boxes at a scan width of 300 KHz per division. It will be necessary to disable the AUTO centering circuitry to verify that the 227 MHz is centered properly.

7-59. LCVCO SHAPER PRINTED CIRCUIT BOARD 1A10A6A1. (See Figure 7-27.)

7-60. Circuit Description. The shaper consists of three regulator circuits and regulates the +18 Vdc input to +6.2 Vdc. This regulated voltage is applied to LCVCO oscillator 1A10A6A2. The regulators produce +17.0 Vdc and -14.7 Vdc. These regulators consist of an operational amplifier and associated transistor. The third circuit in the shaper is the sweep circuit. This circuit provides the sweep, offsets it, position shifts it, and adjusts its gain for proper functioning of LCVCO 1A10A6A2. The LCVCO sweep control consists of operational amplifier Z3, drive transistor Q4 and diodes CR3 and CR5. One diode limits the voltage, while the other acts as a voltage block.

7-61. Troubleshooting. To troubleshoot the LCVCO shaper, refer to paragraph 7-58.

7-62. LCVCO OSCILLATOR PRINTED CIRCUIT BOARD 1A10A6A2. (See Figure 7-27.)

7-63. Circuit Description. The LCVCO oscillator consists of a two transistor oscillator, Q1 and Q2, and transistor Q3. Transistor Q3 is a common emitter providing high gain. The oscillator produces a 248 MHz output at +20 dBm which is either fixed tuned or swept. Transistors Q1 and Q2, in conjunction with capacitors C1 and C2, encompass the oscillator, while transistor Q3 provides the additional gain required in order to achieve a +20 dBm signal at 248 MHz. In addition, there is a coupled down test output at E2. This output provides a 0 dBm test signal at 248 MHz for verification of the output without having to disconnect the assembly.

7-64. Troubleshooting. To troubleshoot the LCVCO oscillator, refer to paragraph 7-58.

7-65. RF AMPLIFIERS 1A10A18 AND 1A10A31. (See Figure 7-28.)

7-66. Circuit Description. The RF amplifier is a one stage broadband transistor amplifier centered at 227 MHz. Centering is adjusted by varying tuned circuit LC1. The amplifiers typically have a gain of 15 dB and a noise figure of 4 dB.

7-67. Troubleshooting. Troubleshooting of the RF amplifiers consists of injecting a signal at 227 MHz at -30 dBm into the input and measuring an output of -15 dBm at 227 MHz at connector J2. Adjust LC1 to obtain the desired output. It should be noted that the placement of the RF transistor leads is critical. This assembly should therefore be serviced only at the factory.

7-68. MIXER BIAS 1A10A4. (See Figure 7-29.)

7-69. Circuit Description. Mixer Bias 1A10A4 provides dc bias for the systems single ended mixer. The mixer bias contains variable capacitor C2 and associated components. This capacitor is adjusted at system level for maximum flatness and amplitude of signals.

7-70. Troubleshooting. Inject a signal at 227 MHz at -10 dB into input connector J1. Verify that a small dc voltage is on resistor R1. Check output connector J2 for the 227 MHz signal. While peaking capacitor C2, the insertion loss should be minimal.

7-71. LOOP CONTROL ASSEMBLY 1A10A5. (See Figure 7-30.) The loop control assembly consists of four subassemblies.

7-72. The 3.5 MHz oscillator 1A10A5A2 consists of an oscillator stage, (which produces the fundamental 3.5 MHz frequency), one stage of amplification, and a filter. The overall amplifier gain is adjusted by varying potentiometer R7. The frequency is controlled by the adjustment of inductor L5. The inductor is located on the case that the 3.5 MHz oscillator is mounted in. Inductor L5 is adjusted to 3.500000 MHz, and R7 is adjusted to provide the necessary gain.

7-73. 3.5 MHz Oscillator 1A10A5A2. (See Figure 7-31.)

7-74. Troubleshooting. To check that the 3.5 MHz oscillator is operating properly, proceed as follows:

1. Monitor the collector of transistor Q1 with either a high frequency oscilloscope or an ac coupled spectrum analyzer.

2. If the oscillator is operating properly, check the output of the collector of amplifier stage Q2 for an output of approximately 0 dBm at 3.5 MHz.

3. Signal trace using an analyzer through the final filter for an output of 0 dB. It will be necessary to vary potentiometer R7 in order to achieve a 0 dB output from the oscillator.

7-75. Comb Source 1A10A5A3. (See Figure 7-31.)

7-76. Circuit Description. The comb source consists of a 2 MHz grounded base oscillator (Q1 and Q2), which produces the 2 MHz oscillating output. This signal is then processed through diodes CR2 and CR3. These diodes are step recovery diodes. The output now is in multiples of the 2 MHz signal. The signal is then processed through three tuned amplifier stages, tuned for maximum power at 100 MHz. The final output is a series of 2 MHz comb lines centered at 100 MHz.

7-77. Troubleshooting. Check the comb source using another spectrum analyzer for the proper 2 MHz output. Then proceed comparing the waveforms (Figure 7-31), with those obtained from the circuit test points. Proper signal tracing will ensure that each section of the circuit is functional and localize the problem should there be a malfunction.

7-78. Loop Control Printed Circuit Board 1A10A5A1. (See Figure 7-30.)

7-79. Circuit Description. Loop Control Printed Circuit Board 1A10A5A1 consists of a narrow bandpass filter amplifier centered at 3.5 MHz. This filter narrows the input to a bandwidth of 500 KHz with a maximum ripple of 5 dB peak-to-valley. The filter is followed by a stage of amplification (Z1) and a stage which provides the limiting action. The limiting level is approximately -80 dB. Following the limiter is the phase detector circuit, which takes the 3.5 MHz IF and mixes it with a 3.5 MHz LO. The phase difference or error voltage is then propagated. This error voltage is then processed through an 8 Hz search oscillator. This oscillator provides the oscillation for the auto phase lock acquisition circuit. When monitoring the loop output, a 2 volt peak-to-peak 8 Hz oscillation should be observed. By grounding the 8 Hz osc disable port E8, the oscillation should disappear. This can be achieved by depressing the SIGNAL CENTER pushbutton on the front panel. The error voltage is then fed through the Yig drivers 1A10A12 to Yig oscillator 1A10A2. The error voltages cause the oscillator to be offset in frequency in such a way that it moves the correct distance to compensate for any deviation from the internal reference oscillator.

7-80. Troubleshooting. Refer to paragraph 7-71.

7-81. 100 MHz Oscillator 1A10A5A4. (See Figure 7-31.)

7-82. Circuit Description. Transistor Q3 operates as a grounded base amplifier and oscillates due to the feedback from the series resonant crystal Y1. This frequency is 100 MHz. A two stage cascaded amplifier, consisting of transistors Q1 and Q2, boost the power level to 500M watts into an impedance of 50 ohms. A protect circuit removes the ground return of transistor Q1's emitter, whenever the SRD is disconnected. This circuit eliminates the need for Q2 to dissipate power when the circuit is unloaded.

7-83. Troubleshooting. Verify that the 100 MHz oscillator is operating properly as follows:

1. Monitor the junction of capacitors C3 and C4, with another spectrum analyzer. It is important to ac couple the analyzer, in order to protect its front end. It may be necessary to vary capacitor C6 to ensure the oscillators stability.

2. Continue to signal trace using the other spectrum analyzer. The final output from the oscillator is approximately +27 dBm. Therefore, any measurement made using another analyzer should be made with care. At least 20 dB of attenuation should be put on the spectrum analyzer during the monitoring. The largest amount of gain is derived from the last stage. Dual emitter transistor Q2 provides maximum gain and care should be taken when servicing this assembly. A heat sink must be used, and properly heat sunk. In addition, in order to achieve the stability and linearity desired at the output, it is necessary to adjust capacitors C12 and C14.

3. After the oscillator appears to be working properly, check the oscillator stability by turning the unit on and off several times.

4. Set SCAN WIDTH/DIV switch to 1 KHz position and depress CALIBRATE pushbutton. Verify stability of the comb lines. If the comb lines are still not stable, readjustment of capacitors C12 and C14 should stabilize the comb lines.

7-84. YIG DRIVER PRINTED CIRCUIT BOARD 1A10A12 AND YIG DRIVER HEAT SINK 1A10A32. (See Figure 7-32.)

7-85. Circuit Description. The Yig driver printed circuit board consists of seven functional blocks. The two major blocks are the Yig oscillator driver and the Yig filter driver. These two circuits are fed by the Yig FM Tuning Sweep signal. This provides the oscillator gain, and a dc voltage which provides the offset for filtering and oscillating. The Offset and Sweep signals are summed by operational amplifier Z1 and fed into a current amplifier (Q1 and Q2). The output of the Yig oscillator driver is applied to the coil of Yig oscillator 1A10A2. The oscillator drive is set up in a Darlington configuration with the emitter of transistor Q1 tied to the base of transistor Q2, providing high current gain. The Yig filter driver is set up in a high slew rate push pull power amplifier configuration.

7-86. The band 5 oscillator gain compensation circuit is tied in with the Yig oscillator driver. This circuit consists of relay K3 that is energized in band 5 only. Relay K3 shorts out resistor R59 for all bands except band 5. Band 5 controls the gain of the oscillator.

7-87. The next functional block is the band 5 full range filter track circuit. Relay K2 applies an additional offset to the Yig filter driver when the full range mode is energized. In addition, it gets switched +24 Vdc from the band 5 manual tune functional block. The 8 Hz oscillator disable circuit, grounds the loops 8 Hz oscillator disable point, by the turning on of FET switch Q11. This is accomplished by depressing the SIGNAL CENTER control on the front panel. The other functional block is the Yig oscillator FM drive. This is active only in the 1 and 3 MHz/div scan widths. This high slew rate amplifier supplies the high current for the FM tuning coil of Yig oscillator 1A10A2.

7-88. Troubleshooting. Troubleshoot Yig Driver Printed Circuit Board 1A10A12 and Yig Driver Heat Sink 1A10A32 as follows:

1. Set the Spectrum Analyzer to 3000 MHz and the SCAN WIDTH/DIV switch to 200 MHz/div. Check the VCO tune for the proper output (waveform A, Figure 7-32). Check the Yig filter tune for the proper output (waveform B, Figure 7-32).

2. To check the 8 Hz oscillator disable circuit, monitor connector J18 pin 6 and depress the SIGNAL CENTER control. Pin 6 should go to ground. Set the SCAN WIDTH/DIV switch to 3 MHz/div. Check deck 1 of 1A2A3 test points TP2, TP3, and TP5 for the associated waveforms (C, D, E, Figure 7-32). Using an oscilloscope, monitor pin 8 for the proper waveform (F, Figure 7-32).

3. If all bands except band 5 (10–22 GHz) are working properly, check the circuits associated with relays K1, K2, and K3 for the proper sequencing.

7-89. SWEEP GENERATOR PRINTED CIRCUIT BOARD 1A11. (See Figure 7-33.)

7-90. Circuit Description. Sweep Generator 1A11 generates the main sweep for the Spectrum Analyzer plus the sweeps required to drive the Yig preselector 1A10A12, Yig oscillator 1A10A2 and LCVCO oscillator 1A10A6A2. The sweep generator is functionally broken down into nine major functional blocks.

7-91. The first block is the 0 to +6 V reference sweep circuit. The reference sweep is generated by operational amplifier Z3 with the integrators time constant enabled by the SCAN TIME/DIV switch. The output is then applied to the non-inverting input of comparator Z8, which sets up the retrace signal. The other input to the retrace circuit comes from the scan mode sync functional circuit. The various sync signals come in on pin 20 of J1 and into comparator Z12 whose threshold level is set to initiate the start pulse for the reference sweep. The balance of the blanking is set by the end of band blanking circuit which senses the position of the Yig oscillator, and by comparing it to the offset, initiates the high and low end blanking pulses.

7-92. The reference sweep is processed through several switches. The output is then applied to the display horizontal gain and sweep amplifier circuits. The display horizontal gain circuit takes the main sweep and provides it with gain and offset. The output of the display horizontal gain circuit is the ramp signal that is applied to the X input of the display in the analog mode and also provides the sweep for the digital mode. The output gain is set by adjusting potentiometer R21. The other functional block that the reference sweep is applied to is the sweep amplifier. This sweep amplifier circuit amplifies the sweep to approximately +30 Vdc, and provides the offset to center the display. The adjustment of potentiometer R12 allows for precise centering. In addition, this circuit provides the level shift for the time domain mode.

7-93. This output of the sweep amplifier circuit is then processed through the SCAN WIDTH/DIV switch and into the tuner and sweep combiner functional block. The signal is combined in this block with the output of the tuning amplifier circuit. The signal is processed through a differential amplifier Z16 and is boosted such that there is sufficient sweep to drive the Yig filter and oscillator. The offset is controlled by the main tuning potentiometer.

7-94. The tuning marker circuit generates the marker as a function of the tuning position and sweep. Its output is offset and processed before being fed into the vertical deflection plates of the CRT in the analog mode or the vertical deflection circuits in the digitized mode.

7-95. The last functional block is the LCVCO tuner sweep circuit. This circuit provides the VCO sweep signal to local oscillator 1A10A6 in the phase lock loop mode. It also receives an offset from the auto centering circuit. This circuit in turn provides an offset to the second oscillator at phase lock acquisition.

7-96. Troubleshooting. To troubleshoot the sweep generator, proceed as follows:

1. Check TP5 for the reference sweep. With SCAN TIME/DIV switch set to $\boxed{3}$ and DOMAIN switch set to FREQ, with a 100 MHz/div scan width, the sweep should be 0 to +6 volt ramp 30 msec in duration. If a sweep doesn't appear, check Z9 pin 12 for a retrace pulse of approximately 4 volts and a period of 35 msec. The sync mode can be checked by going into the Line sync and signal tracing the 8 Vac sine wave through the scan mode sync circuit.

2. After checking reference sweep signal, verify that the main tuning voltage is being applied to connector J1-12. Verify that the main sweep signal is being applied to connector J1-4 and J1-2.

3. Using an oscilloscope, check TP2 for the ramp signal. Adjust potentiometer R21 and verify that the amplitude changes.

4. With the RF RANGE (GHz) switch set to 1.8 to 4.0 and the SCAN WIDTH/DIV switch set to 700 MHz/div, verify that the high and low end blanking is working properly. Verify that the respective potentiometers R42 and R43 cause the blanked areas to change in size.

5. Set the SCAN WIDTH/DIV switch to 10 MHz/div. Check TP1 for a sweep of approximately 30 volts peak-to-peak. Check Z14 pin 3 for the same voltage.

6. While monitoring TP4, vary the main TUNING control and verify that a sweep of approximately +8 volts is present and being offset as the TUNING control is rotated. If the sweep isn't present, trace back through the tuner and sweep combiner, and tuning amplifier circuits to fault isolate to the defective component.

7. To check for the local oscillator sweep, set the SCAN WIDTH/DIV switch to 300 KHz/div. Monitor TP3 for a sweep of approximately +11 volts.

8. Vary the TUNING control and watch for offset. If no sweep appears, check J1-7 for a sweep and J1-6 for a dc offset into the differential amplifier.

9. Set SCAN WIDTH/DIV switch to 100 MHz/div, set the FULL RANGE switch to ON, and check for a tuning notch on the screen. Vary the main TUNING control and see that the notch moves. If the notch is present and doesn't move, check the input of Z15 for the tuning voltage. If the notch isn't present, check Z15, Z11, and Z17. Verify that the notch is present on J1-9. The notch should be approximately 200 mV in amplitude.

7-97. PROCESSED VIDEO PRINTED CIRCUIT BOARD 1A12. (See Figure 7-34.)

7-98. Circuit Description. The processed video printed circuit board consists of eight functional areas. The video input from LOG IF signal is applied to the video amplifier circuit. This circuit is a differential amplifier consisting of transistors Q1 and Q2. The video constant current generator circuit ensures a constant current in this amplifier. In addition, balance and offset signals are applied to the video amplifier These signals offset the output. The output is applied to the video filter select circuit. This circuit supplies the automatic video filtering for the system as a function of the IF bandwidth that is selected. The video output is processed through the LIN/log variable video filter select circuit. This circuit consists of a series of five FET switches (Q11 through Q14 and Q18), which are energized such that either the video is processed through transistors Q11 and Q13, or when the linear mode is selected (transistors Q12, Q13 on), the video is processed through the log to linear converter circuit. When the variable video filter circuit is energized, the video signal is processed through transistors Q11, Q14, and Q18. Capacitor C20 and the setting of the variable video bandwidth potentiometer combine for the RC time constant that create the video smoothing.

7-99. The output of the video filter select circuit supplies video for the video buffer and the contrast baseline clip circuits. The video buffer processes the video offsets, the video, and directly couples this signal to the rear panel video output.

7-100. The contrast baseline clip circuit takes both internal and external blanking pulses and applies them to the display. The circuit also contains the contrast and baseline circuit consisting of Z5, which is used in the analog mode. The last circuit is the blanking output, which takes the blanking signal and inverts it. This signal is then fed to the rear panel blanking output.

7-101. Troubleshooting. Troubleshooting of the processed video printed circuit board is accomplished by signal tracing.

1. Set the VERT SCALE/DIV switch to $\boxed{10}$ log, a center frequency of 3000 MHz and the SCAN WIDTH/DIV switch to 10 MHz. Center a signal on the display.

2. Using an oscilloscope, verify the presence of the video signal on test point TP1. Make sure the VAR VIDEO BW control is fully clockwise (calibration mode).

3. Signal trace the video signal up to test point TP2. This confirms the operation of the video amplifier, the video constant current generator and the video filter select circuits.

4. Check test point TP3 for the presence of the video signal. If it is not present, signal trace from test point TP2 to test point TP3. The FET switches (Q11 through Q14 and Q18) are controlled by a series of transistor circuits (Q9, Q10, Q15 and Q17), whose inputs are either open or grounded.

5. Troubleshoot the contrast baseline clip circuit by signal tracing the blanking pulse through this circuit.

7-102. REGULATOR BIAS PRINTED CIRCUIT BOARD 1A13. (See Figure 7-35.)

7-103. Circuit Description. The regulator bias printed circuit board consists of eight major circuits. These circuits are the plus and minus 6 volt regulators, the +12 unregulated, the -6 volt unregulated, the comb energize delay circuit, the harmonic mixer bias voltage source, the band 5 full range marker offset and the PLL auto centering circuit.

7-104. The plus and minus 6 volt references are derived by taking the system's +18.3 Vdc and dropping it down to +6.2 Vdc through zener diode CR9. This voltage is processed through two operational amplifier regulators (Z1 and Z2) to produce a stable ±6.000 Vdc. The sensing is done remotely. The plus 12 volt and minus 6 volt unregulated sources are derived by dropping down the ±18.3 volts through zener diodes CR8 and CR6 and using a transistor (Q3 and Q2) to maintain the voltage required. The comb energize delay circuit consists of transistor Q1, which is fired by -18 Vdc. This in turn controls the gate of silicon controlled rectifier VR1. When the VR1 fires, it is slowed down by an RC time constant, which provides the delay to the turning on of the comb source.

7-105. The harmonic mixer bias circuit basically provides a switched dc voltage to the mixer bias assembly. Diodes CR1 through CR5 provide the block to the dc, for the non-energized bands.

7-106. The band 5 full range marker offset circuit provides a switched ground, when both band 5 and the FULL RANGE switch are energized at the same time.

7-107. The last circuit is the PLL auto centering. The loop output error voltage is measured by this circuit. PLL takes the loop output error voltage, provides a gain of 3 through Z10 and converts the analog voltage into a digital word in A/D converter Z9. The digital word is sampled and held by Z7 before it is reconverted into an analog voltage of equal magnitude. This voltage is then inverted and given band gain compensation, in Z3 when needed, and finally the signal is fed into a constant current generator Z4. The constant current generator outputs a signal to the summing input of an operational amplifier which is located on the Sweep Generator Printed Circuit Board 1A11. This amplifier, in turn, feeds the sweep to the 248 MHz oscillator and indicates to the oscillator that it must move an amount equal and opposite to the loop error voltage. This is what causes the image signal on the screen to center after phase lock acquisition. The intent of this circuit being that it cancels out any offset that may have been introduced by the main local oscillator, while trying to acquire one of the reference comb lines.

7-108. Troubleshooting. The regulator bias printed circuit board is broken down into nine functional blocks. To troubleshoot the regulator bias board, proceed as follows:

1. Using a digital voltmeter, check test point TP5 for +6.00 ±.01 volts. If the voltage is not present, check the low voltage power supply 1A4 for ±18.3 Vdc. Check the cathode of CR10 for a 6.2 Vdc. If this voltage is not present, check operational amplifier Z2, and transistor Q5.

2. Using the digital voltmeter, check test point TP4 for -6.00 ±.01 volts. If the voltage isn't present, check operational amplifier Z1, and transistors Q7 and Q8.

3. Verify that the unregulated supply voltages are present. Test point TP3 should read +12 Vdc and test point TP1 should have a -6.0 Vdc on it.

4. To check the mixer bias circuit, verify that the RF RANGE (GHz) switch is in band 1 (.001 – 2.0 GHz). Check J1-1 for +18.3 Vdc. Monitor J1-6 with a digital voltmeter. Check that a small dc voltage is present, as the RF RANGE (GHz) switch is switched through bands 2 to 5.

5. Set RF RANGE (GHz) switch to band 5 (10 – 22 GHz). Monitor J1-7 with a digital voltmeter. Set FULL RANGE switch to ON. Verify that +24 Vdc is present at J1-7 and that P1-B6 is grounded.

6. To check the comb energize delay circuit, push the SIGNAL CENTER control in, and verify that -18 Vdc is switched to J1-36. Using an oscilloscope, verify that the -18 Vdc is outputted from J1-8 with a slight delay. If this circuit is not functioning properly check transistor Q1 and silicon controlled rectifier VR1.

7. To troubleshoot the PLL auto centering circuit, open the circuit at J1-16 and inject +1 Vdc into J1-16. Using a digital voltmeter, measure the voltage at test point TP2. The gain of the PLL error amplifier is approximately 3. Therefore, the voltage at test point TP2 should be approximately 3 Vdc. Set the SCAN WIDTH/DIV switch to 300 KHz/div. The voltage at J1-21 should be 3 Vdc. If this voltage isn't present, verify that operational amplifier Z8 is holding the outputs of Z9 low out of phase lock as the A/D converter is a tri-state logic integrated circuit. With the RF RANGE (GHz) switch set to 1.8 to 4.0 (band 2), check the voltages at Z3 pin 6. The voltage should be 1.5 Vdc. The voltage at P1-B9 should also be 1.5 Vdc.

7-109. DIGITAL DISPLAY PRINTED CIRCUIT BOARD NO. 2 1A14. (See Figure 7-36.)

7-110. Circuit Description. Digital display printed circuit board No. 2 consists of nine functional circuits. Two oscillators (gate oscillator and 250 KHz count oscillator) provide the gate pulses and clocking signals for the board. The gate oscillator clocks the gate, which fires Z11B. The Q output of Z11B causes the FET transistor switch Q1 to switch on and differentiator Z6 to generate a sweep between 0 and +18 Vdc. This sweep output is then fed into operational amplifier Z7, where it is offset by -18 Vdc. The resultant output is a sweep signal that varies between +18 Vdc and -18 Vdc. This sweep is directly coupled into operational amplifier Z2 along with the output of the digital display gain circuit. The converter circuit also has the main tuning voltage offsetting it, and a feedback circuit, which is band sensitive. These outputs feed directly into comparator Z3, which provide the gate shut down command to Z11A. The latch circuit holds the count until the counter disable signal is applied.

7-111. Troubleshooting. To troubleshoot digital display printed circuit board No. 2, proceed as follows:

1. With the RF RANGE (GHz) switch set to the 1.8 – 4.0 GHz position, ground test point TP1. The CENTER FREQUENCY (MHz) readout should read 3000. Adjustment of the band 2 display slope potentiometer R66 may be necessary, in order to obtain this result.

2. Using an oscilloscope, check the output of operational amplifier Z6 for a 0 to +18 Vdc varying waveform.

3. Monitor test point TP2 for a waveform varying from +18 Vdc to -18 Vdc range.

4. Remove the ground from test point TP1. Vary the TUNING control, while monitoring the output of Z1. Verify that the tuning offsets the voltage level at the output.

5. Check Z13 pin 11 and verify that the pulse to shut off the gate is being made. Check to see that a negative pulse is being applied to Z11 pin 3 to open the gate.

7-112. DIGITAL DISPLAY PRINTED CIRCUIT BOARD NO. 1 1A15. (See Figure 7-37.)

7-113. Circuit Description. Digital display printed circuit board No. 1 consists of a series of gates (Z1, Z2, Z10) which, when grounded as a function of the frequency band selected, causes a count pulse to be processed. The output of the gates are a series of SN74176 integrated circuits Z8, Z16, Z17 and Z24, which function as a ripple counter. These counters are followed by a SN7475, which is a four bit bistable latch (Z20 through Z23). These integrated circuits act as a temporary storage register of the binary information until it receives a transfer pulse from Z11 of digital display board No. 2 1A14. When the transfer pulse occurs, the information is gated to a BCD-to-seven segment decoder driver, which converts the count for the seven segment LEDs.

7-114. Troubleshooting. Troubleshooting of digital display printed circuit board No. 1 is accomplished by signal tracing. Verify that digital display printed circuit board No. 2 1A14 is operating properly and that the preset strobe and clock pulse are present. Also make certain the latch command is present on the board.

1. Set the RF RANGE (GHz) switch to 1.8 – 4.0 GHz (band 2) and ground test point TP1 on digital display printed circuit board No. 2 1A14. This will force the counter to read 3000 MHz, when functioning properly. Make certain that the SIGNAL CENTER and FREQ ADJ controls are centered.

2. Using an oscilloscope, check the counting sequence of the LED that is not functioning properly. The binary weight is indicated on the schematic. A logic high means that the line is turned on.

3. By removing the 250 KHz crystal on digital display board No. 2 1A14, the preset numbers should appear. By doing this, the levels on digital display board No. 1 1A15 can be checked against the preset number as follows:

Preset Number	Band
99848	1
1044	2
3114	3
4785	4
9000	5

7-115. CRT CONTROLLER. The following paragraphs provide circuit descriptions for the circuit boards of the CRT controller. These circuit descriptions, along with the maintenance schematic diagrams, are provided as an aid to troubleshooting. The CRT controller consists of the following printed circuit boards:

a. Frequency and Power Reference Encoder 1A16.

b. Character Generator and Data Encoder 1A17.

c. Horizontal Timing 1A18.

d. Display Timing and Horizontal Output 1A19.

e. Pushbutton Interface and Line Generator 1A20.

f. Data Digitizer and Memory Logic 1A21.

7-116. Frequency and Power Reference Encoder Printed Circuit Board 1A16. (See Figure 7-38.)

7-117. The function of the frequency and power reference encoder printed circuit board is to encode the output sign and/or digits from Absolute Power Board 1A6 and Digital Display Boards 1A14 and 1A15 into the five least significant bits of an ASCII format (refer to Table 7-3).

7-118. Upon the automatic selection of the center frequency encoder, the ENCFR- signal goes low. This signal now enables the tri-state outputs of the 74LS251 chips (Z12, Z11, Z10, Z9, Z13). These chips in turn drive ASCI0+, ASCI1+, ASCI2+, ASCI3+, and ASCI4+ respectively. These five bits represent the five least significant bits of the ASCII code. On Character Generator and Data Encoder Printed Circuit Board 1A17, the ASCI5+ and ASCI6+ signals are set to one and zero respectively allowing a selection of any ASCII numeric and several symbols including the decimal point and blank.

7-119. The frequency information is encoded into seven separate characters beginning with two numerics and/or blanks, followed by a symbol (blank or decimal point) which is followed by three more numerics and/or blanks, followed by an alpha character (M or G). The five digit information enters the board as five binary coded four bit bytes. Associated with each digit, except the least significant digit, is an active low blanking signal (FRBK1-, FRBK2-, FRBK3-, and BRBK4-). When a blanking signal is low and the BCD code is zero, the ASCII code for the associated digit will represent a blank

Table 7-3. ASCII Format

Character	ASCII Hexadecimal Code
0	30
1	31
2	32
3	33
4	34
5	35
6	36
7	37
8	38
9	39
Blank	20
+	2B
–	2D
.	2E

digit. When the FRBK2- blank signal is active low, the third most significant character will be a blank; otherwise, it would be a decimal point. The least significant character would be an M under this condition (representing MHz); otherwise, it would be a G (representing GHz).

7-120. A decoder within each 74LS251 chip selects the appropriate input character by decoding the DBIT2+, DBIT1+, and the DBIT0+ signals. A 000 code, respectively, indicates that the most significant character is being encoded, and a 110 code indicates that the least significant character is being encoded.

7-121. Upon the automatic selection of the power reference encoder, the ENREF- signal goes low. This signal now enables the tri-state outputs of the 74LS251 (Z14) and the 74LS253 chips(Z16,Z15). These chips in turn drive the ASCI0+, ASCI1+, ASCI2+, ASCI3+, and ASCI4+. As with the frequency encoder ASCI5+ and ASCI6+ are set to one and zero, respectively, on Character Generator and Data Encoder Printed Circuit Board 1A17.

7-122. The power reference information is encoded into four separate characters beginning with a symbol (+, - or blank) which is followed by three numerics and/or blanks. When the PRFP- signal is low, a "+" character is encoded as the most significant character, and when PRFM- is low, a "-" character is encoded. If both PRFP- and PRFM- are high, then a blank character is encoded as the most significant character. The second most significant character is encoded by PRF01-. When PRF01- is low, the character will be a "1"; if PRF01- is high, the character will be a blank. The least significant and second least significant digits are encoded into ASCII format from the input BCD signals. The second least significant digit, however, differs from the first in that it will be coded as a blank character whenever the second most significant digit is a blank and the input coding for the second least significant digit is a zero.

7-123. A decoder within each 74LS253 and the 74LS251 chip selects the appropriate input character by decoding the DBIT1+ and the DBIT0+ signals. A 00 code, respectively, indicates the most significant character is being encoded and an 11 code indicates the least significant character is being encoded.

7-124. The PRFBK- signal, which is generated on Absolute Power Board 1A6 is low whenever the EXPAND switch is set to NOISE and the VERT SCALE/DIV switch is set to a position other than $\boxed{10}$ LOG. In this state, the PRFP- and PRFM- signals will be high and the multiplexers will remain in the most significant character position. This will force a blank character on all four character positions on the display.

7-125. All input signals from the digital display and absolute power boards are buffered by the 7416 chips. The outputs from these chips are tied to a rear panel connector in order to provide external monitoring of the frequency and power parameters. In addition, four ground points are provided to the rear connector as a reference.

7-126. Character Generator and Data Encoder Printed Circuit Board 1A17. (See Figure 7-39.)

7-127. The function of the character generator and data encoder printed circuit board is to encode the scan time, scan width, IF bandwidth, and the vertical scale. This board also controls the character and dot pattern generation.

7-128. The scan width is encoded by two priority encoders (74LS348) Z5 and Z6. Each input to the chips is pulled up by a 10K resistor. The priority encoders encode the input scan width information into a binary format which is buffered to the rear panel through 7416 gates. This information is also buffered to a 74S471 prom (program C) Z10, via a 74LS244 chip (Z13) when ENSCW- is low. DECD2+, DECD3+, DECD4+, DECD5+ are 0000, respectively, when a 1 KHz/division scan width is selected by SCAN WIDTH/DIV switch 1A2A1 (SW1X3- is low) and 1011 when a 700 MHz/division scan width is selected by SCAN WIDTH switch 1A2A1 (SW7X8- is low). Only one of the 14 input signals may be low at one time for proper encoding of the input.

7-129. The scan time is encoded by two priority encoders (74LS348) denoted by Z14 and Z15. Each input to both chips is pulled up by a 10K resistor. The priority encoders encode the input scan time information into a binary format which is buffered to the rear panel through 7416 gates. This information is also buffered to a 74S471 prom (program C) Z10, via a 74LS244 chip (Z13) when either ENSCT- or ENSTS- is low. DECD2+, DECD3+, DECD4+, DECD5+ is 0000, respectively, when a 1 sec/division scan time is selected by SCAN TIME/DIV switch 1A2A1 (ST100- is low), and 0101 when a 10 μs/division scan time is selected by SCAN TIME/DIV switch 1A2A2 (ST1X5- is low). Only one of the 11 input signals may be low at one time for proper encoding of the input.

7-130. The vertical scale is encoded by priority encoder (74LS148) Z24. Each input to the chip is pulled up by a 10K resistor. The priority encoder encodes the input vertical scale information into a binary format which is buffered to the rear panel through 7416 gates. This information is also buffered to a 74S471 prom (program C) Z10, via a 74LS244 chip, Z12, when ENVTS- is low. DECD2+, DECD3+, DECD4+, DECD5+ are 0000, respectively, when the linear scale is chosen (AMPLX- is low), and 1100 when a 10 dB/division scale is chosen (AMP10X- is low). Only one of the four input signals may be low at one time for proper encoding of the input.

7-131. The IF bandwidth is encoded by priority encoder (74LS148) Z21. The inputs to the encoder come from four inverters which are driven from voltage dividers. These voltage dividers are provided to limit the output voltage swing as the input logic levels swing between -18 volts to +18 volts. The series diodes are added to protect the input circuitry. The four output dividers also drive four 7416 gates, which are used to drive front panel LEDs, which indicate the bandwidth selected.

7-132. The priority encoder encodes the input IF bandwidth information into a binary format, which is buffered to the rear panel through 7416 gates. This information is also buffered to a 74S471 prom (program C) Z10, via a 74LS244 chip, Z12, when ENIBW- is low. DECD2+, DECD3+, DECD4+, DECD5+ are 0000, respectively, when the 1 kHz bandwidth is selected (I1X0X+ is +18 volts), and 1100 when a 1 MHz bandwidth is selected (I1X3X+ is +18 volts).

7-133. An output driver circuit to drive the UNCAL LED on the front panel is provided on this board. The active low output stage is provided by a 7416 gate, which is driven by a delay circuit whose output is Q1. The delay circuit integrates any input changes such that the input must be present for a minimum of 300 msec before the LED assumes the desired state. This circuit is included to prevent LED flicker when changing between two uncalibrated positions of the IF bandwidth.

7-134 The AI1X1+, AI1X2+ and AI1X3+ input signals represent the automatically selected IF bandwidth signals. These signals are active high at +18 volts and low at -18 volts. Divider circuitry and input diode protection similar to that of the manually selected IF bandwidth signals are provided. Additional logic is provided in order to assure a logic 1 signal on pin 8 of Z19 is present when an uncalibrated IF bandwidth condition occurs. This high signal will illuminate the UNCAL LED after the previously mentioned delay condition.

7-135. An uncalibrated IF bandwidth condition exists whenever the manually selected IF bandwidth is lower than the automatically selected IF bandwidths. The output of the 74LS20 gate, Z19 pin 8, adheres to the following equation:

$$\begin{aligned}\text{output} = {} & [(\text{AI1X1+})\cdot(\text{I1X0X})] \\ & + [(\text{AI1X2+})\cdot((\text{I1X0X+}) + (\text{I1X1X+}))] \\ & + [(\text{AI1X3+})\cdot((\text{I1X0X+}) + (\text{I1X1X+}) \\ & + (\text{I1X2X+}))]\end{aligned}$$

7-136. The remaining logic on this board provides the control for character generation and the data encoders. The major control element is 74S471 program B prom Z8. This prom provides the ASCII code for all non varying alphanumerics on the display and provides for the proper selection of the data encoders. The input of this prom directs the prom as to which area of the screen is being currently scanned. CADD5+, CADD4+, and CADD3+ indicate the vertical character position of the scan. A 000, respectively, indicates a bottom row scan. CPRGT+, CPAD8+, CPAD4+, CPAD2+, and CPAD1+ indicate the horizontal position of the character that is being scanned. CPRGT+ is high when the group of characters in the right half of the screen is being scanned, and it is low when the group on the left is being scanned. CPAD8+, CPAD4+, CPAD2+, and CPAD1+ is 0000, respectively, when the leftmost character of a group is being scanned, and 1011, respectively, when the rightmost character is being scanned. The AMPLX- input is provided at this point to optimize the data usage of this prom. When low, this signal provides an address modification to label the word LINEAR on the display below VERT SCALE.

7-137. As mentioned earlier, the outputs of this prom consists of two types of information:

a. ASCII data for the fixed alphanumeric characters.

b. Data source selection.

7-138. When a fixed alphanumeric character is to be displayed, data bit 8 from Z8 is low thereby enabling the 74LS244 tri-state buffers on Z9. Data bits 0–7 will contain the ASCII code for the given character and will be buffered to the MCM6674 character generator, Z18. The character generator decodes the ASCII input into a 7 x 5 dot matrix pattern. This chip provides a five bit row output for each character whose row is selected by the CADD2+, CADD1+, and CADD0+ inputs. A 001, respectively, decodes the top row, and a 111, respectively, decodes the bottom row.

7-139. When a variable alphanumeric is to be displayed, data bit 8 from Z8 is high, thereby disabling Z9, and enabling one half of dual two-to-four line multiplexer (74LS139) Z2. Through the decoding of data bits six and seven either one of the following variable alphanumeric data sources will be enabled: power reference, center frequency, the first digit of the scan time (using decoder prom Z10), or the second decoder which, in turn, decodes the remaining input parameters which use decoder prom Z10.

7-140. The center frequency (ENCFR- low) and power reference (ENREF- low) are decoded in the same manner. When enabled, both ASCI5+ and ASCI6+ signals are enabled through the 74LS125 buffers, Z1, which are, in turn, controlled by DBIT3+ and DBIT4+, respectively. The remaining ASCII bits (which are decoded through the MCM6674 character generator Z18, are driven by the selected output buffers. The character position that is being decoded is denoted by DBIT2+, DBIT1+ and DBIT0+. The leftmost varying character is 000, respectively, and the rightmost is 111, respectively.

7-141. When the second decoder is enabled, or when ENSTS- is enabled, the decoder PROM, 74S471 program C, Z10, is also enabled. This PROM provides the ASCII codes to character generator Z18. The character to be displayed is determined through three sets of inputs to this prom. First DBIT0+ and DBIT1+ indicate which parameter is being decoded, and DBIT3+ and data bit 4 indicate which of four variable characters of the parameter is being encoded. DECD5+, DECD4+, DECD3+, and DECD2+ are encoded inputs from the tri-state buffers of the selected input parameter, indicating the current parameter value.

7-142. Through this method, the five bit code for each row of each alphanumeric character displayed on the screen will be sequentially present at the output of the character generator.

7-143. Horizontal Timing Printed Circuit Board 1A18. (See Figure 7-40.)

7-144. The horizontal timing printed circuit board provides the control logic that is needed to provide a horizontal sweep for both the alphanumeric characters and digital waveforms, as well as analog waveforms. This board also formats the output dot pattern. The horizontal timing board accepts the five bit output data code from Character Generator Data Encoder Printed Circuit Board 1A17 and applies it to the parallel inputs of the 74LS166 shift register (Z17). With the control of the LOADX- and SHIFT+ signals (generated on Display Timing and Horizontal Output Printed Circuit Board 1A19), the data is shifted out on the DOTDS+ signal line through transistor Q1 and voltage divider R4 and R5. The output waveshape will be approximately 1.1 volt peak when a dot is to be activated, and 0 volts when a dot is not to be activated.

7-145. The remainder of this board is used to control the display mode and horizontal ramp output. The 74LS161 (Z1) pin 13 and 14 control the output mode of the display. When pin 13 is high, the alphanumeric characters are being scanned; when low, a waveform is being scanned. When pin 14 is high, waveform B is being scanned, and when low, waveform A is being scanned. When the RDTEN+ signal input (from Pushbutton Interface and Line Generator Printed Circuit Board 1A20) is low, the alphanumeric readout is disabled.

7-146. The horizontal binary weighting is counted on three 74LS161 chips (Z18, Z19, Z20). These three chips count from 0 to 1024 when displaying either an A or B waveform. When displaying characters, the counters will count from 0 to 246, and then parallel load when CRSET- is low and count from 775 to 1024. The vertical row count is handled by two 74LS161 chips (Z21, Z22). The CADD2+, CADD1+, and CADD0+ outputs from Z21 represent the dot row within a character; the counter parallel loads at 001, respectively, (representing the top row) and counts to 111 (representing the bottom row). The CADD5+, CADD4+, and CADD3+ signals represent the row of characters being scanned. A 000 represents the top row, and a 101 represents the bottom row. Upon completing the bottom row, a 74LS10 gate (Z23) decodes this occurance and through a 74LS08 gate (Z15) enables a parallel load to Z1, thereby disabling the alphanumeric readout for the rest of the present display cycle. The 74LS161 counter (Z2) is included to allow a retrace time to exist between scans. A 1.75 usec retrace time is provided between character scans and a 24 usec retrace time is provided between digital waveform scans.

7-147. The 74LS74 flip flops, Z10, are used to reset the horizontal counters and disable them until the reset period has ended. The flip flops also provide the HRRST- (Horizontal Reset Strobe) and SWPEN+ (Sweep Enable Signal). The 74LS157 chip, Z9, multiplexes both the horizontal clock output and the data clock. The horizontal clock may be either 4 MHz (created by a 74LS124 (Z8) and crystal Y1 or 250 kHz which is divided down from a 4 MHz on Pushbutton Interface and Line Generator Printed Circuit Board 1A20. The data clock, which drives the vertical output register, may be either 4 MHz or the horizontal clock gated by DSLAT-. The multplexer is controlled by the DSCHR+ (Display Character Signal) gated by the horizontal reset signal. DSCHR+ also controls the DOTEN- signal which is used to steer the intensity output multiplexer on Pushbutton Interface and Line Generator Printed Circuit Board 1A20.

7-148. The 74LS74 flip flops, Z5, are used to control the alphanumeric scans in the auto bypass mode when a horizontal sweep faster than 3 msec/div is required, or when a sweep of 3 msec/div is present during the bypass mode. When the Q output (pin 5, Z5) goes high, it permits counters Z18, Z19, Z20 to increment, and thus allows the display of characters to begin tracing once after the end of the next horizontal sweep. In this realtime mode, the ratio of alphanumeric sweeps to waveform sweeps varies with the sweep time chosen. At 1 msec/div and 3 msec/division, the ratio is 1 to 1; at 0.1 msec/div the ratio is 1 to 2, and at .01 msec/div the ratio is 1 to 5. This ratio is required as to permit the greatest amount of analog sweeps to be displayed per second and still allow alphanumerics to be presented without flicker.

7-149. The division of the waveform sweeps is handled by a 74LS161, Z6. Its count is modified by the parallel inputs, pin 3 and 4, which are controlled by the ST1X5- input (10 usec sweep). The output of the counter is gated to control flip-flop clock, Z5 pin 11, by the ST1X5- and ST1X4- inputs (10 usec/div and 100 usec/div sweeps respectively). The input to the counter, BGSWP+, goes high every time a new waveform sweep begins. The MANUL- signal (low when in manual mode) and the CALEN- signal (low when the internal calibration signal is on) will both disable the auto bypass mode (intermingling alphanumeric data with analog waveforms at sweeps faster than 3 msec/div).

7-150. The output signal, SBYPS+, is used to control the X and Y multiplexers on Display Timing and Horizontal Output Printed Circuit Board 1A19, as well as the intensity output on Pushbutton Interface and Line Generator Printed Circuit Board 1A20. When SBYPS+ is high, all the analog waveform data is displayed on the screen; when low, all the digital data is displayed. The output controlling gate, 74LS01, Z4, pin 10, is controlled by two inputs. Z12, pin 9, when low, will always produce a bypass mode (analog waveform). This occurs when the unit is in auto bypass, or in bypass at 3 msec/div sweep and the analog sweep is being scanned on the screen. In all other modes, this signal is high permitting the 74LS02 output Z12, pin 10 to be the gating signal. This signal will be low and enable the analog waveform whenever the readout is disabled (RDTEN+ is low) and the auto bypass mode is enabled, or a 3 msec/div sweep is present in the bypass mode (the manual and calibration modes must be disabled). This signal will also be low whenever the bypass mode is chosen and the auto bypass is disabled and either the manual mode, calibration mode or non-auto bypass mode is selected. ARDDS- is an active low signal indicating that the system is in the auto bypass mode, or when a 3 msec/div sweep is selected while in the bypass mode. ABYDS- is an active low signal indicating that the system is in the auto bypass mode only.

7-151. Display Timing and Horizontal Output Printed Circuit Board 1A19. (See Figure 7-41.)

7-152. This board provides the timing for both the dot and line generation, as well as the analog horizontal output, and a 4 MHz clock divider, which divides the clock to a 1 MHz output.

7-153. The dot generator timing is accomplished through the clocking of three 74LS161 counters, Z2, Z16, Z17. The counters are reset by HRRST- at the end of each sweep. The count is enabled by two input signals, DSCHR+ and SWPEN+. DSCHR+ is true whenever an alphanumeric sweep is in progress, and SWPEN+ is true whenever a horizontal sweep is in progress.

7-154. CPRGT+ is true whenever the right group of characters is being scanned, and false whenever the left group of characters is being scanned. CPAD8+, CPAD4+, CPAD2+, and CPAD1+ count the characters horizontally, as they are scanned in each group. A 0000 count, respectively, represents the leftmost character in a group of twelve, and a 1011 represents the rightmost character. The CHARL+ signal becomes true once after the fourth dot of every character, and becomes false after the character has been completed. This signal synchronizes loading of analog waveform data into memory on the Data Digitizer and Memory Printed Circuit Board 1A21. The SHIFT+ pulse becomes true after every three input counts and either parallel loads the dot data onto the shift register on Horizontal Timing Logic Printed Circuit Board 1A18, or shifts the data out depending on the logic level of the LOADX- signal. This signal also enables the output dot driver. The LOADX- signal is active low once during the beginning of each character on the sweep. This permits the parallel loading of the character dot information and the display of the leftmost dot. The CRSET- signal provides a parallel load of the horizontal output counters after the first twelve horizontal characters have been displayed (left group is complete). This jumps the CRT beam to the right side of the display to begin scanning the right group. This parallel load occurs on the second pulse after the fifth dot of the twelfth character. The 74LS74 flip-flop output, Z21, pin 8, is used to stretch the access time needed by the character generator and data encoder board by 250 ns from 500 ns to 750 ns. The DSLAT- signal is active low and prevents the horizontal output from changing position but once in every three clock counts. This facilitates the setting of the dot position and prevents dot smearing on the screen.

7-155. The two flip-flops on 74LS74, Z19, divide the input clock to a 1 MHz output, which is used on the Data Digitizer and Memory Printed Circuit Board 1A21.

7-156. The 74LS161, Z18, counter controls the line generator counter. The LGB16+, LGB08+, LGB04+, LGB02+, and LGB01+ signal lines provide a 29 state counter counting from 00011 to 11111, respectively. The first counting series which occurs after the alphanumeric scans are complete; however, it has 32 states counting from 00000 to 11111, respectively. The LGTCC+ and LGTCC- signals are positively and negatively active, respectively, whenever a terminal count of 11111 is present.

7-157. The 74LS74 flip-flops on Z3, and the 74LS273, Z11, are used to latch digital horizontal position data whenever HRCLK+ goes high. The outputs of these latches are cleared to zero when HRRST- goes low. The output of these latches are presented to an MC3410C 10 bit D/A converter, Z4. The -4 mA output on pin 3 is then converted to an output voltage through the LF356, Z5. This voltage, whose offset and gain can be varied by R7 and R6, respectively, represents an analog output sweep. The output sweep is then presented to the input of an IH5043 multiplexer, Z6 pin 6, along with the output sweep (Ramp) of the Spectrum Analyzer which is input at pin 8. SBYPS+ controls the multiplexer and directs the chosen input to the Horz output, which is connected to the X input of the CRT display. When SBYPS+ is high, the ramp input is enabled; when low, the D/A output is enabled.

7-158. The second half of the IH5043 works in a similar manner by multiplexing the digitally created vertical signal (DVERT+) and the analog vertical signal (BVIDEO) to the Vert output signal which is connected to the Y input of the CRT display. When SBYPS+ is high, the BVIDEO signal is selected; when low, the DVERT+ signal is selected.

7-159. Pushbutton Interface and Line Generator Printed Circuit Board 1A20. (See Figure 7-42.)

7-160. This board contains the following elements: ±15 volt regulators, +10 volt reference, alphanumeric line position prom, calibration circuit, line generator, pushbutton interface, and memory mode controller.

7-161. The +15 volt and -15 volt power source for this board and other boards within the CRT controller are regulated on the LM340 T-15 chip, Z43, and the LM320T-15 chip, Z42, respectively. The output voltages are regulated from an input system power source of +18 volts and -18 volts.

7-162. The +10 volt reference which is supplied by a TL074C operational amplifier, Z19, a 2N4401 transistor, Q1, a 1N825 (6.2 volt zener diode), CR1, and several resistors, supplies a stable reference to all digital to analog converters, as well as to some op amp summing junction resistors which are used to offset the outputs. No adjustments are supplied in this reference to compensate for the zener diode voltage variations, because any reference offset is compensated in each op amp configuration during the calibration procedure.

7-163. The alphanumeric line position prom (74S471, Z26) provides the vertical position data that is required in accordance with the CADD0+ through CADD5+ input signals. These input signals which are developed on Horizontal Timing Printed Circuit Board 1A18 provide information as to which character row is being scanned and which row within the character is being scanned. The output of the prom provides a binary weighting of the vertical position which is presented to the 74LS273, Z24, inputs. Whenever DSCHR- is low, the alphanumeric characters are being scanned. When DSCHR- is low, DATA0+, which is driven by its inverse DSCHR+, will be low.

7-164. The calibration circuit is enabled whenever CALIBRATION switch S1 is closed, and the system is not scanning alphanumerics on the display (DSCHR+ is low). This condition will, in turn, enable the 74LS244 buffer, Z25, which drives the DATA0+ through DATA7+ signal lines. The DATA8+ signal line is driven by the output of a 74LS01 gate, Z4 pin 1. The two input signals to this circuit, ADD07+ and DSAEN+, encode the data outputs required to display the calibration waveforms. When DSAEN+ is high, the system is scanning the channel A waveform, enabling the ADD07+ signal to modify the data outputs. The ADD07+ signal is a squarewave signal, which is one address bit of the horizontal position counter located on the horizontal timing card. This signal produces a four cycle squarewave waveform on the display whose amplitude varies from the top most graticule line to the bottom most graticule line. The ADD07+ signal produces this waveform by concurrently controlling all the data lines (making them all ones or all zeroes at the same time). When the DSAEN+ signal is low, channel B is being scanned. In this mode DATA8+ is high, and all other data bits are low, thereby displaying a single horizontal line located on the center graticule.

7-165. The line generator consists of the creation of a vertical line whose length is equal to the vertical distance between two consecutive dots. The line generation is initiated by creating two currents at the outputs of each of two 10 bit digital to analog converters (MC3410) Z1 and Z21, pin 3. The output of Z21 will vary from approximately 0 mA to -4 mA, depending upon the vertical position of the line generators starting point. 0 mA represents the bottom of the display while -4 mA represents the top of the display. The output of Z1 will vary from approximately 0 mA to -4 mA depending upon the direction and magnitude of the line to be displayed. 0 mA represents a line that is to be directed toward the bottom of the display, with an amplitude that extends the full vertical height of the entire graticule. A -4 mA output represents a line that is to be directed toward the top of the screen, with an amplitude that extends the full vertical height of the entire graticule. A -2 mA output indicates that the line is to have no vertical excursion. In short, currents between 0 and -2 mA are negative going lines, and currents between -2 mA and -4 mA are positive going lines. The line lengths are proportional to the delta of the given current to the -2 mA nominal.

7-166. These currents are developed through the use of latches and adders. The first data point, represented by a 9 bit data word is generated by Data Digitizer and Memory Logic Printed Circuit Board 1A21 is loaded into both a 74LS273, Z24, and a 74LS175, Z41. These bits are clocked into the latches by DTCLK+ which is generated on the Horizontal Timing Printed Circuit Board 1A18 every time a new horizontal location is attained. On the next clock pulse, this first set of data is parallel loaded into three 74LS175 chips, Z41, Z23, Z22, and the next consecutive data point data is loaded into the initial latches. At this time, two consecutive data point information is available concurrently on this board. By applying the first data work into the Z21 D/A, a current representation of the vertical position of the waveform can be obtained. By taking the inverse of this digital data and adding it to the output of the second data position through the use of three four bit adders, 74LS283, Z2, Z3, Z40, a digital weighting of the difference is obtained, indicating a digital representation of the direction and magnitude of the required line. The digital word is then applied to the input of Z1 D/A and is converted to a current, as described earlier.

7-167. The current output of the Z1 D/A is applied to the input of a TL074C op amp, Z19 pin 13. A current, created by R31, R38, and the +10V reference, is summed at this point and may be adjusted such that the total current output from the sum of these two currents will vary between +2 MA to -2 mA. The op amp will convert this current to an output voltage which varies from +2 volts to -2 volts. The voltage is applied to the input of an integrator which consists of op amp Z19, resistor R29, potentiometer R39, capacitor C7, and dual SPDT switch (IH5043) Z18. Potentiometer R39 is used to adjust the integration rate (slope). The switches, Z18, are provided to control the integration. The switch at pins 16 and 1 closes to start integration and opens to stop. The switch at pins 9 and 8 closes to reset the integrator (short capacitor C7) and opens to permit integration. The switch at pins 3 and 4 is used to initialize the integration voltage. The switch at pins 5 and 6 is used to enable a current spike into the integrator. When the integrator is enabled, this current spike is formed by the switch (C8, R27, and R40). This spike is added to compensate for the charge dumping that occurs when the switch at pins 8 and 9 is opened. Potentiometer R40 is added to compensate for varying charge dumps between IH5043 chips.

7-168. The timing for the integrator is controlled by the outputs of two J-K flip-flops on Z5. Through the use of some additional logic, the timing inputs which are generated from the line generator counter on the Display Timing and Horizontal Output Printed Circuit Board 1A19 are decoded and are used to steer the Q outputs of the flip-flops. The inverse of the 4 MHz input is used to drive the clock inputs of the flip-flops. The 250 KHz signal from Z5 pin 5 is used in timing circuits on the Horizontal Timing Printed Circuit Board 1A18.

7-169. The output of the integrator, which varies between approximately -5 volts to +5 volts, on Z19 pin 7, is then current summed through R23 and is again converted to a voltage output on pin 6 of Z20, an LM356 op amp. The output, DVERT+, is then distributed to the Display Timing and Horizontal Output Printed Circuit Board 1A19. This signal, which contains the vertical information of both the alphanumerics and digital waveforms may have its gain adjusted through R5 and have its offset adjusted through R41.

7-170. The different lengths of lines that are drawn by the generator within the same time period, require that the intensity be modulated in order to provide display waveforms of uniform intensity. This is accomplished through the use of the output pin 14 of Z19 whose absolute value of the output voltage is proportional to the line length. By full wave rectifying this -2 volt to +2 volt output through TL074 op amps, Z38, an output voltage varying between 0 volts and 2 volts may be obtained at the pin 8 output of Z38. This output voltage is proportional to the length of the line to be drawn and is applied to the INTNS+ output, which drives the Z input of the CRT, through resistor R9 and multiplexers Z39. Potentiometer R42 is used to provide an adjustment for a nominally desired intensity offset for the display.

7-171. The intensity output must be turned on and off during the display period. This is accomplished through the use of a 2N4401 transistor, Q2, and its associated driver. The 74LS01 output, pin 10, Z4, provides the control for the output switch. The input at pin 9 enables the output when the integrator is enabled and disables it during the set up time and reset period as long as the other input, pin 8, is high. This other input, pin 8, is controlled by several inputs through the use of some random logic. The line intensity will be enabled only when SWPEN+ is high (when a digital waveform sweep is in progress). The intensity will be disabled when DSBEN+ is high (the channel B waveform is being scanned) and concurrently when ENCHA+ is high (only channel A is enabled). The intensity signal will also be disabled whenever CALEN+ is low (calibration mode is disabled) and concurrently when the input on pin 3 of Z8 (74LS02) is low. This second input is the latched output of the LBLNK- signal, which is the memory output signal, from Data Digitizer and Memory Printed Circuit Board 1A21, which controls the sections of the waveform, if any, that are to be blanked due to an uncalibrated spectrum analyzer state.

7-172. The output multiplexers, IH5043, Z39, control the source of the Z output signal, INTNS+. The multiplexer whose output is pins 5 and 9 controls whether the signal to be output is the blanking output (analog waveform intensity output, BLANK-) or the output of the previous multiplexer. These states are obtained by the input signals, SBYPS+, being high or low respectively. SBYPS+ is generated on Horizontal Timing Printed Circuit Board 1A19. The first multiplexer whose output is pins 4 and 16 selects either the dot output (DOTDS+, which is generated on the Horizontal Timing Printed Circuit Board 1A18) or the digital waveform intensity output. The DOTEN- control signal is low and high, respectively. The DOTEN- signal is generated on Horizontal Timing Printed Circuit Board 1A18. The analog waveform intensity output, BLANK-, may be adjusted through potentiometer R43.

7-173. The pushbutton interface controls the various display modes that are enabled through the pushbuttons on the front panel. The pushbuttons used are SPDT type, break before make configuration. The two outputs of the switches are pulled up to 5 volts through a 10K resistor on the board, and the inputs to each switch are grounded. Both inputs to each switch (except that of A and B VIEW A) are input to a 74LS279 chip, Z36 or Z17, where they are debounced. The A pushbutton and B VIEW A pushbutton are handled differently as they directly interact. The active low output of each pushbutton are input to a 74L279 flip-flop, pins 1 and 3 of Z17 through two 74LS32 gates, such that only one of two modes may be enabled at one time. These input signals are disabled when either the system is in the auto bypass mode (ABYPS- is low), or the system is in the bypass mode (pin 2 of Z51 is low). When channel A is enabled, the channel A LED is enabled by driving the 7416 output (LNCHA-) (pin 2 of Z52) low. When B VIEW A is active, the B VIEW A LED is enabled by driving the 7416 output, LNCHB-, (pin 12 of Z7) low. However, when either the auto bypass or bypass modes are active, neither LED will be enabled.

7-174. The BYPASS pushbutton toggles the outputs of a 74LS74 (pins 8 and 9 of Z50) every time it is pushed, enabling and disabling the bypass function. When the system is in the auto bypass mode, the BYPASS pushbutton will be disabled at pin 3 of Z36. When bypass is enabled the BYPSN- output will be low and the BYPASS LED is enabled by driving the 7416 output, LBYPS-, (7416 pin 10 of Z52) low. The BYPASS LED will also be enabled whenever the auto bypass mode is enabled (ABYPS- is low).

7-175. The READOUT DISABLE pushbutton toggles the output of a 74LS74, (pins 5 and 6 of Z50). When activated, the RDTEN+ signal is enabled high as well as the READOUT DISABLE LED by driving low the LDISB- signal output of a 7416 (pin 8 of Z52). When the system is in a bypass mode and ARDDS- is high, the READOUT DISABLE pushbutton inputs are disabled and the READOUT DISABLE LED is enabled.

7-176. When the SAVE pushbutton is depressed, the 74LS74 outputs (pin 8 and 9 of Z33) will toggle if in the B VIEW A mode or the outputs of another flip-flop (pins 5 and 6 of Z33) will toggle when in the A mode, as long as the system is not in the manual sweep mode. If in the A mode, the Q output, pin 5 of Z6, will go high and input to the D pin of another 74LS74 (pin 2 of Z31). The $\overline{Q}$ output, pin 6, will enable LDSTR-, low, in order to enable the SAVE LED. Upon having the BGSWP+ signal go high (the input analog sweep has begun) the clock input, pin 3 of Z31, goes high through the 74LS86 gate, thereby forcing the Q output high, pin 5, and the $\overline{Q}$ output low (pin 6). This will enable STREA+ high, indicating that the data on this analog sweep is to be stored in the A memory. Concurrently, the first flip-flop will be reset, and the LED will remain enabled. When the BGSWP+ signal goes low, the analog sweep has ended. The Q output (pin 5 of Z31) will go low disabling both the LED and STREA+. When in the manual sweep mode, MANUL- is low and the second flip-flop is disabled. The first flip-flop is configured to toggle every time the SAVE pushbutton is depressed. Thus, in the manual mode, the save function may be both enabled and disabled by depressing the SAVE pushbutton. In all other modes, the save function is enabled by depressing the SAVE pushbutton and disabled automatically at the end of the next complete sweep, the channel B save mode works in an identical manner.

7-177. The hold mode is enabled by depressing the HOLD pushbutton. This will toggle the clock inputs of the 74LS74 flip-flops, Z15. When channel A is enabled, the Q output of the flip-flop, pin 9 of Z15, is high when the HOLD pushbutton is enabled. The Q output is then ANDed at the input of a 74LS51, Z10, with the channel A enable signal and the recall not output, pin 8 of Z13. The 74LS51 output is then gated with a bypass enable signal. The HOLD LED is enabled, and the SIGNAL IN LED is disabled. The output signal, INPTA+, is also disabled. The channel A hold mode is disabled whenever the input or SIG-IN MEMORY pushbutton is depressed. The channel B hold mode works in a similar manner.

7-178. The recall mode for channel A is enabled by depressing the RECALL pushbutton when the channel A mode is enabled. This enables the RECALL LED when not in a bypass mode and disables the SIGNAL IN LED. When in the channel A recall mode the DSMEM- signal is low when the DSAEN+ signal is enabled, and when in the channel B recall mode DSMEM- is low when DSBEN+ is high. Channel B hold works in a similar manner.

7-179. The input-memory function is enabled when the SIG-IN MEMORY pushbutton is depressed and clocks 74LS74 flip-flops, Z32. When channel A is enabled, the Q output is clocked high, pin 9 of Z32, and the SIG-IN MEMORY LED is enabled. This mode is reset whenever the RECALL or SIGNAL IN pushbutton is depressed. The channel B input memory mode works in a similar manner.

7-180. The CALEN- signal is used to disable the DATEN+ signal from the output of the 74LS02, pin 13 of Z8. When CALEN- is high, DATEN+ will be enabled high whenever DSAEN+ or DSBEN+ is high.

7-181. Data Digitizer and Memory Logic Printed Circuit Board 1A21. (See Figure 7-43.)

7-182. This board functions as a data digitizer by converting the analog input sweep and vertical data into digital data. This board stores this information into its memory and has the capability of normalizing this data.

7-183. The address information for the memories comes from two sources. The ADD00+ through ADD09+ signals are the horizontal data that is generated on Horizontal Timing Printed Circuit Board 1A18. These signals are enabled onto the address bus through 74LS244 chips, Z16 and Z15, when the ADDEN- signal is low. This provides the memory with readout information required during the waveform scan.

7-184. The MAD00+ through MAD09+ signals are generated through a 74LS374 chip, Z17, and a pair of 74LS125 gates whenever AADEN- is low. This provides the memories with address information of the incoming sweep that is being converted.

7-185. The DSBEN+ input signal is used to steer the memories when they are being read to refresh the display. When DSBEN+ is high, channel B is being refreshed; when low, channel A is being refreshed. The ADD11+ signal, driven by a 74LS00 output, pin 3 of Z37, is high when a recall memory is being displayed (recall or input-memory modes), or low when the input memory is being read (input or input-memory modes).

7-186. The DTIN0+ through DTIN8+ signals are a binary weighting of the input vertical signal, which are stored in a 74LS273, Z22, and a 74LS74, Z23. These signals are the data inputs of the memory. The MDAT0+ through MDAT8+ signals are the memory output signals. The read/write and memory enable strobes are RWSTR- and MENEN- signals, respectively. The INT BLANKING signal input to memory chip Z13, is a TTL signal which when high indicates that the current information on the display should be blanked. The BAD00- through BAD08- signals are active low open collector signals buffered to the rear panel, representing the current address position of the display. The BDAT0- through BDAT8- signals are also active low buffered output signals to the rear panel that represent the current vertical data on the display. The CA+CB- buffered signal output is low when channel A is being scanned and high when channel B is being scanned. The IN+RC- buffered signal is low when the input memory is being scanned and high when a recall memory is being scanned.

7-187. The normalizer circuitry is implemented through three 74LS283 adders (Z30, Z28, and Z46). When the input-memory mode is enabled (SUBEN- is low), the recall data is enabled onto the MDATA bus and is inverted through 74LS04 gates. This inverted data is then latched into a 74LS273 octal flip-flop, Z27, and a 74LS74, Z33. The MDAT8+ signal is handled differently in that it is not inverted until after it is latched at the $\overline{Q}$ output, pin 6 of Z33. The data signals are latched by the LTCLK- signal, which is the output of a 74LS139, pin 10 of Z34. After the recall data is latched, the input data is enabled onto the MDATA bus and is added to the stored inverted recall data. This enables a 9 bit subtraction result at the output of the 74LS283 chips. The outputs of the adders are buffered through a 74LS244 chip, Z47 and through a 74LS125 gate, pin 3 of Z49. These buffers are enabled whenever DATEN+ is high and pin 13 of Z30 is high. The other 74LS244, Z48 and 74LS125 gate, pin 11 of Z49, is enabled whenever DATEN+ is high and pin 13 of Z30 is low. This occurs whenever the signal overranges or underranges (the signal value is at the bottom of the graticule or lower, or the value is at the top of the graticule or higher). When an overrange value is calculated, the circuitry will display a waveform that is located at the top most graticule line and when it underranges, it will display a waveform on the bottom most line. When in an overrange condition, pin 11 of Z30 will be high, forcing all ones on the data bus. When in an underrange condition, the pin 11 of Z30 will be low, and all zeroes will be forced on the data bus.

7-188. The blanking output signal, LBLNK-, is generated from memory and a flip-flop. When low, the LBLNK- signal will blank the current waveform data. When in the input or recall modes, the LBLNK- signal is merely the inversion of the memory output. When in the input-memory mode, the LBLNK- signal will be low if either the input or recall signal was blanked.

7-189. The memory write control is located on this board. This process is initiated whenever CHARL+ goes high or when LGTCC- goes low. This occurrence will set the Q output of a 74LS74 flip-flop, pin 9 of Z31, if a new sample of data has been acquired, that is pin 5 of Z5 is high. This will enable a 74LS161 counter, Z32, which will count to a binary 9 and then reset to zero and stop counting. Pins 13 and 12 of the counter represents four memory states consisting of A or B storage memory or A or B input memory. These 2 bits are latched by a 74LS74, Z53, and buffered to the memory address bus through a 74LS244 chip whenever the write circuitry is enabled. The bits are also decoded into four states by a 74LS139 chip, Z34. These states are inverted and compared with the required memory states into which the data is required to be written (STREB+, STREA+, INPTA+, INPTB+). When a desired memory state is reached the MEMEN- signal goes low, enabling the memories and the RWSTR- signal, pin 8 of Z52, to provide the write strobe to these memories.

7-190. The 74LS139 decoder Z34, whose enable is pin 15, is used, together with additional logic, to provide the LTCLK+ signal (loading signal used for the normalizer), the ADD11+ signal (used to address the recall memories) and the BSTRB- signal (used to strobe in the back panel output signals). The timing of these signals is developed through the line generator control in the Display Timing and Horizontal Output Printed Circuit Board 1A19.

7-191. The analog signals are digitized in a series of stages consisting of TL074C op amps. The first stage inverts the input video signal and adds the marker to it (pin 7 of Z59). In the next stage, the combined output is amplified and an offset and gain adjustment is provided (pin 1 of Z59). Next the signal is peak detected through the use of diode CR2, analog switch Z60, and capacitor C7. The peak signal is buffered at pin 14 of Z45. The signal is sampled and held through the use of analog switch Z60 and capacitor C5. The signal is again buffered at pin 7 of Z7 and a current sum with the MC3410 D/A output, Z43, is formed at pin 2 of the LM311 comparator, Z25.

7-192. When not in the manual mode, MANUL- is high, permitting the $\overline{Q}$ output of a 74LS74 to go low, pin 6 of Z40. This occurrence permits the peak detector to be in the non reset state. This also releases the clear signal on the three 74LS193 counters (Z18, Z19, and Z20). The Q output of a 74LS74, pin 5 of Z57, goes high now enabling the $\overline{Q}$ output of the next 74LS74, pin 8 of Z57, to go low. This resets the previous 74LS74 on the next rising 1 MHz input clock pulse. It also resets both successive approximation registers, 25L04, Z41 and Z42. On the next clock pulse, the second 74LS74 resets forcing pin 8 of Z57 to go high. The pin 3 output of Z42 now goes high disabling the clock input, pin 3 of Z37, and triggering the Q output of a 74LS123 one shot, pin 5 of Z58. This, in turn, resets the peak detector. At the same time the Q output of a 74LS74, pin 9 of Z40, goes high enabling the hold mode of the sample and hold. At this time, the 25L04 will continue to operate at a 1 MHz rate by activating successive bits of the MC3410 D/A and testing the comparator output, pin 7 of Z25. The binary weight of the input analog signal will appear at the Q outputs of the 25L04 and will be latched at the 74LS273 chip, Z22, and at the 74LS74 Q outputs, pin 5 of Z23, and pin 9 of Z23. When the conversion is complete, the sample and hold flip-flop is reset and the Q output of a 74LS123, pin 15 of Z58, is set. This prevents another conversion from beginning for at least 9 usec.

7-193. The horizontal ramp is converted by two methods. In the non-manual mode, a digital staircase is generated as the ramp increases. The ramp is amplified by a TL074C op amp at pin 8 Z59. An offset adjustment, R33, is provided. The signal passes through a sample and hold which is in the sample mode and is buffered to an input of a comparator, pin 2 of Z44.

7-194. When pin 7 of Z44 goes high, the vertical conversion as described above begins. When pin 6 of Z55 goes high, the horizontal counter outputs of Z18, Z19, and Z20 are latched in a 74LS374, Z17, and two 74LS74 flip-flops, Z21. When the vertical conversion is complete, pin 3 of Z42 will go low incrementing the three counters. This will, in turn, increase the current output of an MC3410, Z24. The voltage output of the current to voltage converter will increase, pin 1 of Z45. This will, in turn, bring the comparator output, pin 7 of Z45, low until the ramp increases enough to trigger another conversion.

7-195. In the manual mode, the horizontal position is converted by a successive approximation register in a similar manner to the vertical position. A horizontal input sample and hold is formed by Z60, C6, and an op amp whose output is pin 14 of Z59. The sample and hold works in a similar manner to that of the vertical sample and hold. Both the vertical 25L04 and horizontal 25L04 work simultaneously. The 10 outputs of Z41 are continually parallel loaded into the horizontal counters. The horizontal position information is enabled whenever the data is to be written into memory.

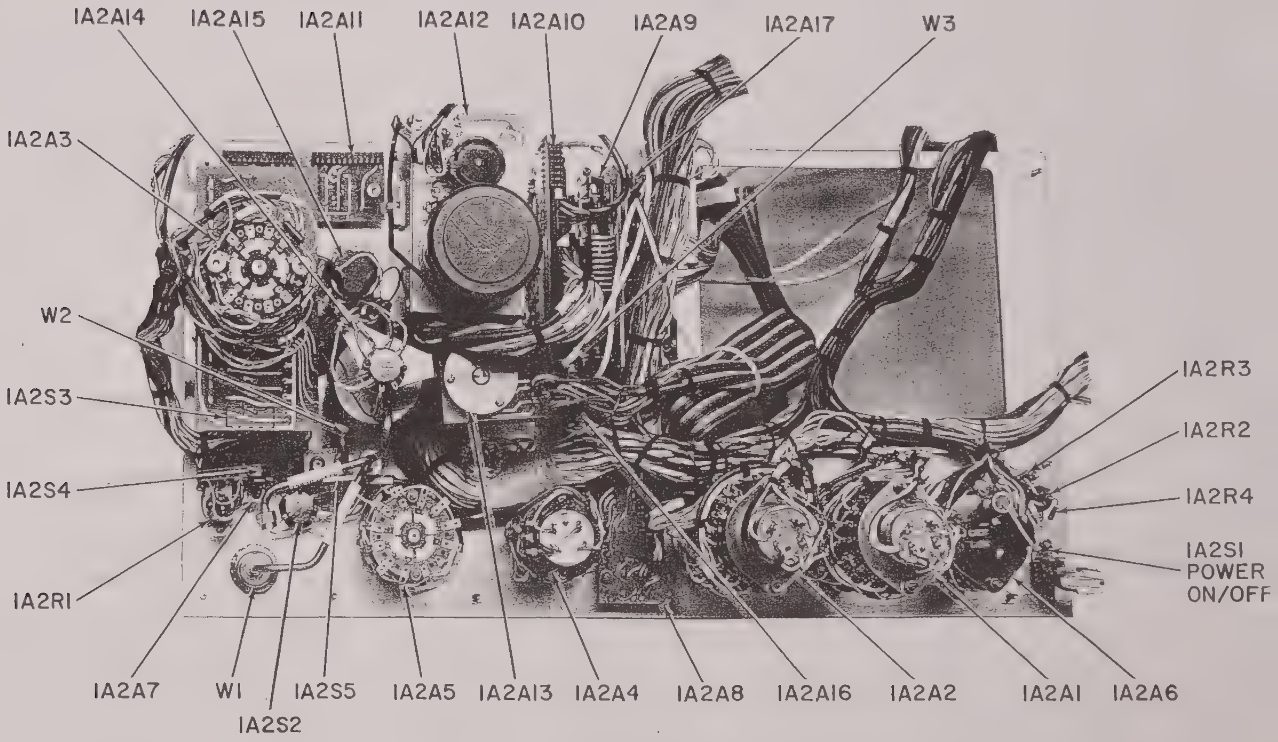
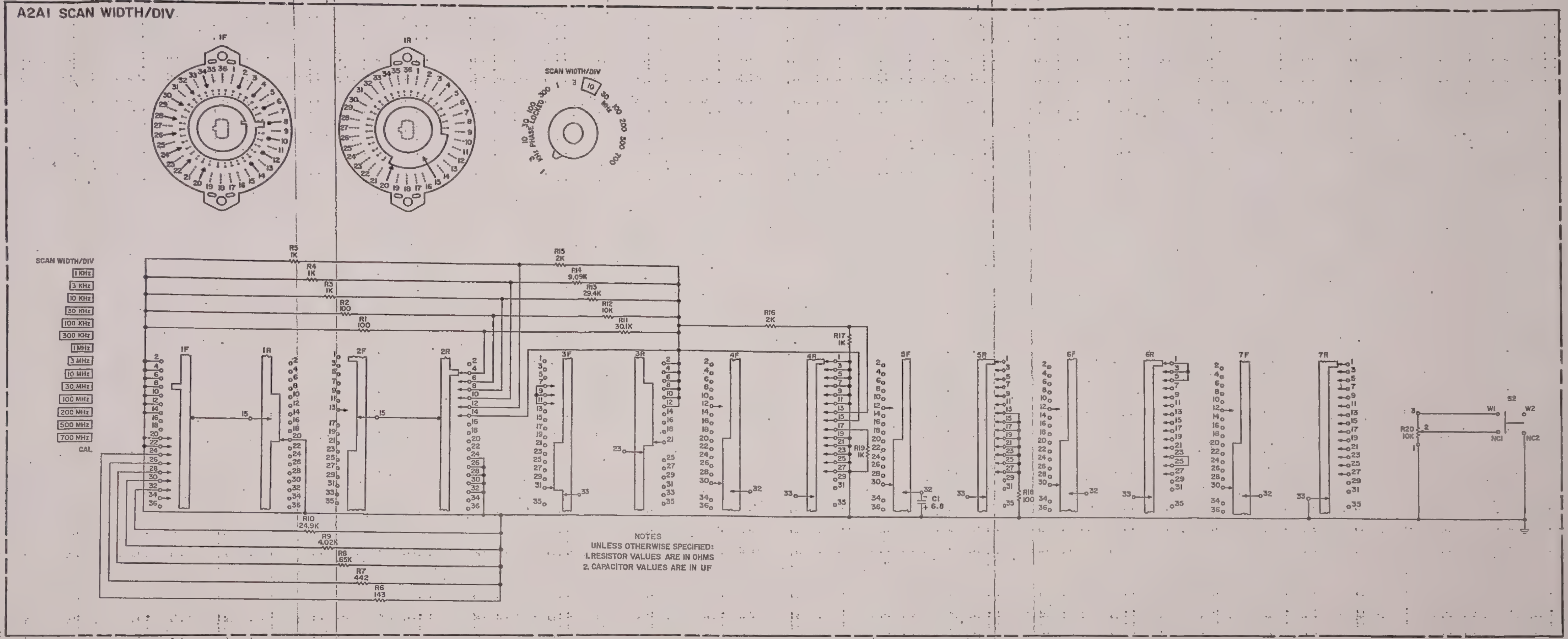

1A2A14
1A2A15
1A2A11
1A2A12
1A2A10
1A2A9
1A2A17
W3
1A2A3
W2
1A2S3
1A2S4
1A2R1
1A2R3
1A2R2
1A2R4
1A2S1 POWER ON/OFF
1A2A7
W1
1A2S2
1A2S5
1A2A5
1A2A13
1A2A4
1A2A8
1A2A16
1A2A2
1A2A1
1A2A6

Figure 7-6. Front Panel Assembly 1A2, Component Locations


A2A1 SCAN WIDTH/DIV
IF
IR
SCAN WIDTH/DIV
1 3 10 30 100 200 500 700 MHz
10 30 100 300 kHz
PHASE LOCKED
SCAN WIDTH/DIV
1 KHz
3 KHz
10 KHz
30 KHz
100 KHz
300 KHz
1 MHz
3 MHz
10 MHz
30 MHz
100 MHz
200 MHz
500 MHz
700 MHz
CAL
R5 1K
R4 1K
R3 1K
R2 100
R1 100
R15 2K
R14 9.09K
R13 29.4K
R12 10K
R11 30.1K
R16 2K
R17 1K
R19 1K
R18 100
R10 24.9K
R9 4.02K
R8 .65K
R7 442
R6 143
C1 6.8
R20 10K
1F
1R
2F
2R
3F
3R
4F
4R
5F
5R
6F
6R
7F
7R
S2
W1
W2
NC1
NC2
15
23
32
33
35

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF

Figure 7-7. Scan Width Switch Assembly 1A2A1,
Maintenance Schematic Diagram

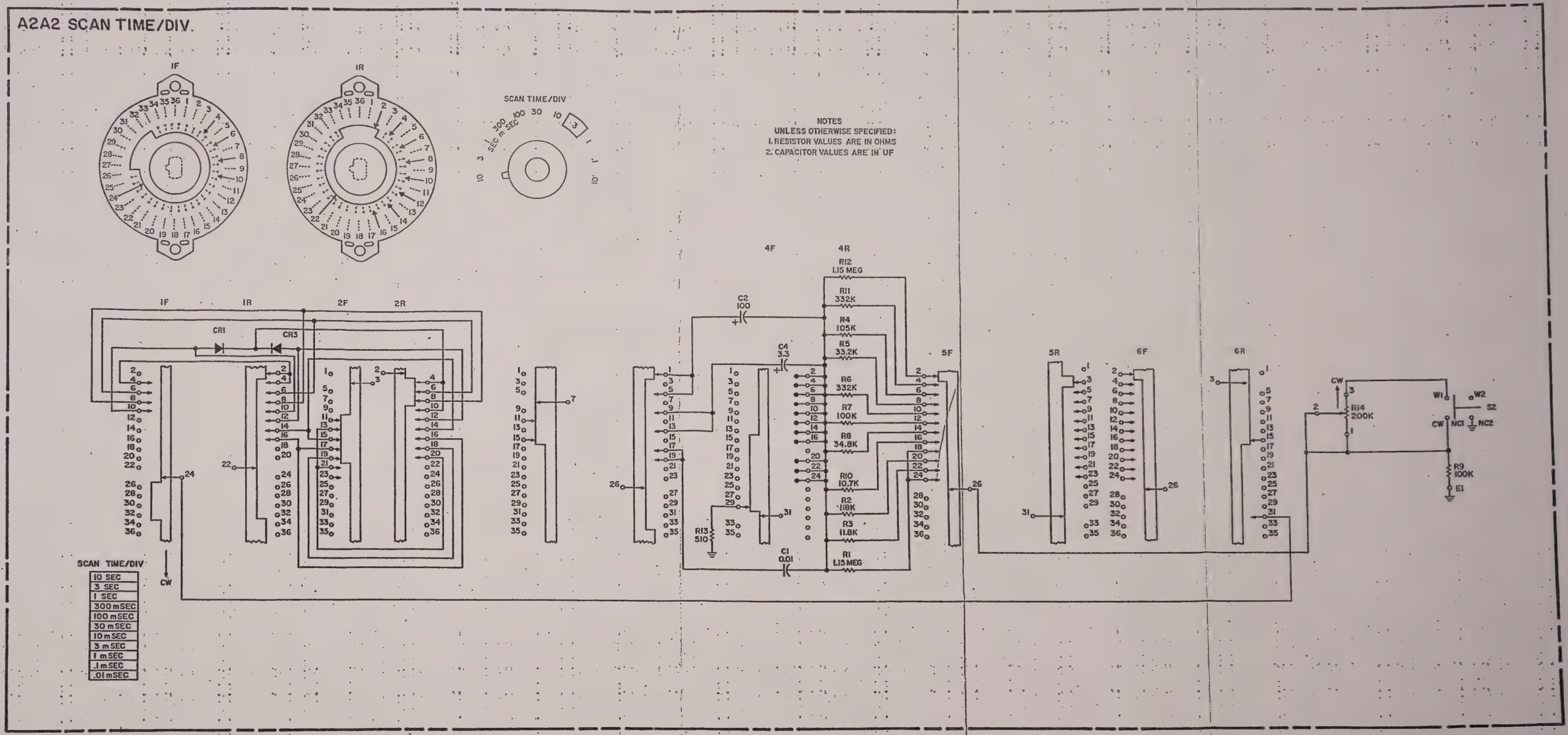
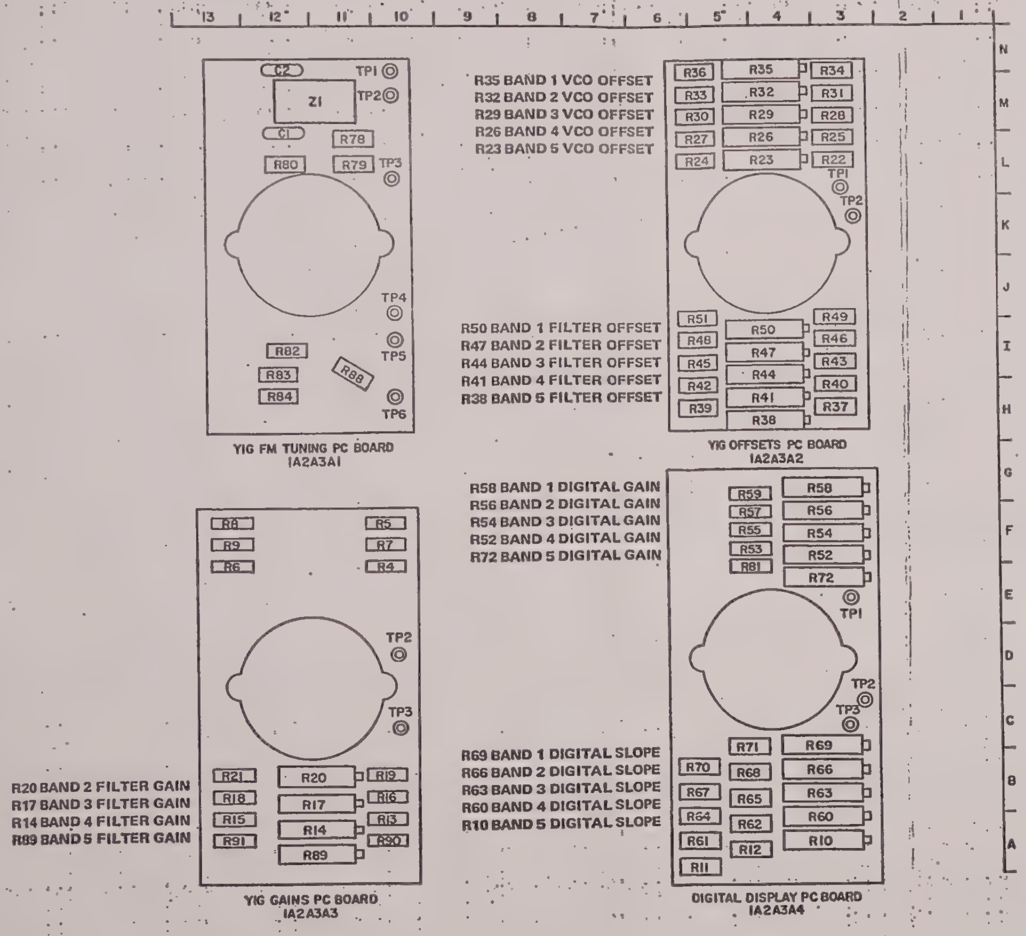

A2A2 SCAN TIME/DIV.
1F
1R
SCAN TIME/DIV
10 3 1 SEC 300 100 30 m SEC 10 3 1 .1 .01
NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
1F
1R
2F
2R
CR1
CR3
4F
4R
C2 100
C4 3.3
C1 0.01
R12 1.15 MEG
R11 332K
R4 105K
R5 33.2K
R6 332K
R7 100K
R8 34.8K
R10 10.7K
R2 118K
R3 11.8K
R1 1.15 MEG
R13 510
5F
5R
6F
6R
CW
R14 200K
W1
W2
S2
NC1
NC2
R9 100K
E1
SCAN TIME/DIV
10 SEC
3 SEC
1 SEC
300 mSEC
100 mSEC
30 mSEC
10 mSEC
3 mSEC
1 mSEC
.1 mSEC
.01 mSEC

Figure 7-8. Scan Time Switch Assembly 1A2A2, Maintenance Schematic Diagram

7-35/36 blank

PARTS LOCATION INDEX; RF RANGE SWITCH 1A2A3

RENCE NATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	12M	R30	5M	R62	4A
C2	12N	R31	3M	R63	4B
		R32	4M	R64	5B
R1	NOT USED	R33	5M	R65	4B
R2	NOT USED	R34	3N	R66	4B
R3	NOT USED	R35	4N	R67	5B
R4	10F	R36	5N	R68	5B
R5	10F	R37	3H	R69	4C
R6	13F	R38	4H	R70	5B
R7	10F	R39	5H	R71	4C
R8	13F	R40	3I	R72	3E
R9	13F	R41	4H	R73	NOT USED
R10	4A	R42	5I	R74	NOT USED
R11	5A	R43	3I	R75	NOT USED
R12	5A	R44	4I	R76	NOT USED
R13	10B	R45	5I	R77	NOT USED
R14	12B	R46	3I	R78	11M
R15	13B	R47	4I	R79	11L
R16	10B	R48	5I	R80	12L
R17	12B	R49	3J	R81	4F
R18	13B	R50	4I	R82	12I
R19	10C	R51	5J	R83	12I
R20	11B	R52	3F	R84	12H
R21	13B	R53	4F	R85	NOT USED
R22	3L	R54	4F	R86	NOT USED
R23	4L	R55	4F	R87	NOT USED
R24	5L	R56	4F	R89	12A
R25	3L	R57	4F	R90	10A
R26	4L	R58	4G	R91	13A
R27	5L	R59	4G		
R28	3M	R60	4B	Z1	12M
R29	4M	R61	5A		


13 12 11 10 9 8 7 6 5 4 3 2 1
N M L K J I H G F E D C B A
C2 TP1 Z1 TP2 C1 R78 R80 R79 TP3 TP4 TP5 R82 R83 R84 R88 TP6
R36 R35 R34 R33 R32 R31 R30 R29 R28 R27 R26 R25 R24 R23 R22 TP1 TP2
R51 R50 R49 R48 R47 R46 R45 R44 R43 R42 R41 R40 R39 R38 R37
R8 R5 R9 R7 R6 R4 TP2 TP3 R21 R20 R19 R18 R17 R16 R15 R14 R13 R91 R89 R90
R59 R58 R57 R56 R55 R54 R53 R52 R81 R72 TP1 TP2 TP3 R71 R69 R70 R68 R66 R67 R65 R63 R64 R62 R60 R61 R10 R11 R12

R35 BAND 1 VCO OFFSET
R32 BAND 2 VCO OFFSET
R29 BAND 3 VCO OFFSET
R26 BAND 4 VCO OFFSET
R23 BAND 5 VCO OFFSET

R50 BAND 1 FILTER OFFSET
R47 BAND 2 FILTER OFFSET
R44 BAND 3 FILTER OFFSET
R41 BAND 4 FILTER OFFSET
R38 BAND 5 FILTER OFFSET

YIG FM TUNING PC BOARD 1A2A3A1

YIG OFFSETS PC BOARD 1A2A3A2

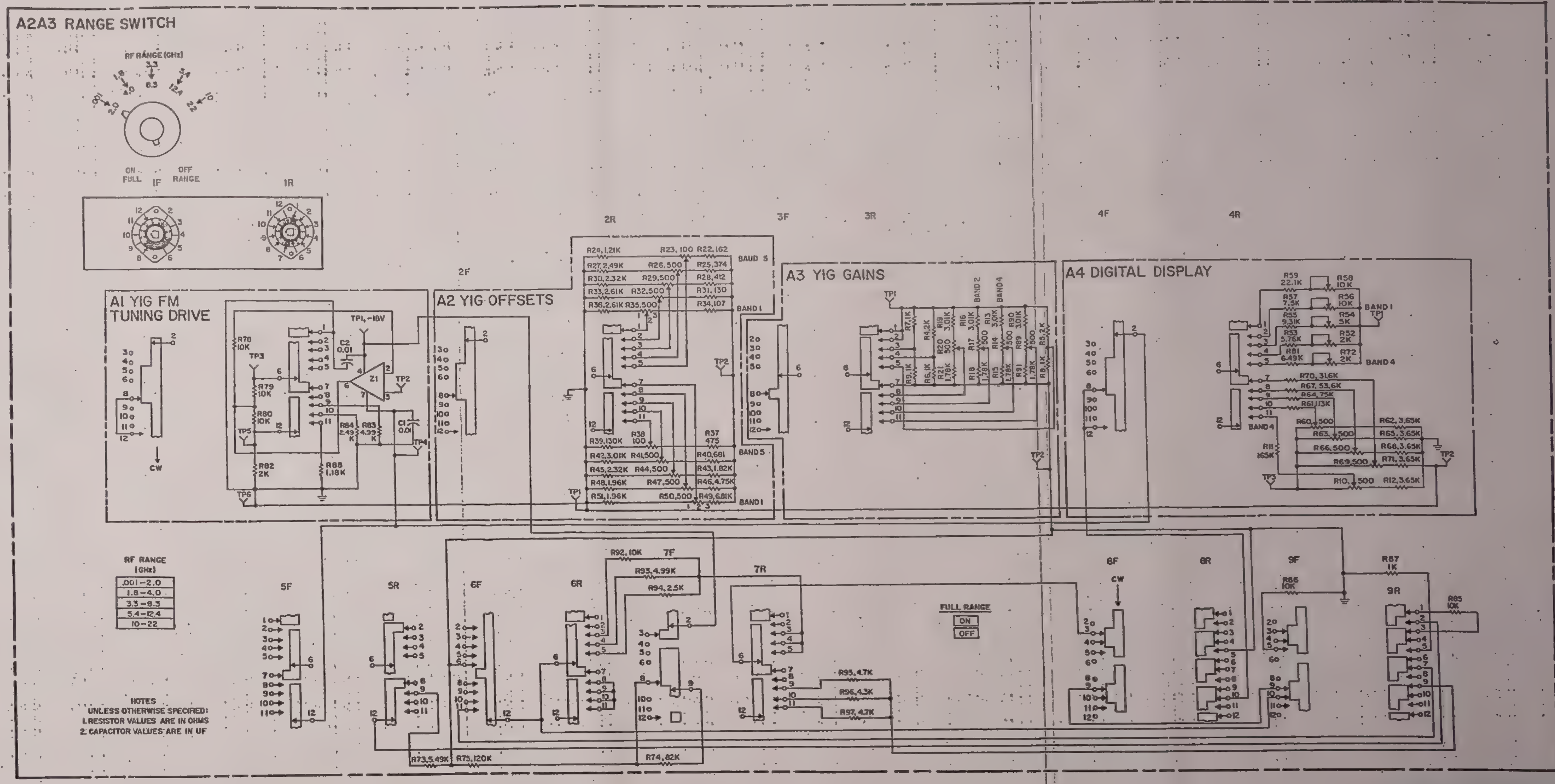
R58 BAND 1 DIGITAL GAIN
R56 BAND 2 DIGITAL GAIN
R54 BAND 3 DIGITAL GAIN
R52 BAND 4 DIGITAL GAIN
R72 BAND 5 DIGITAL GAIN

R69 BAND 1 DIGITAL SLOPE
R66 BAND 2 DIGITAL SLOPE
R63 BAND 3 DIGITAL SLOPE
R60 BAND 4 DIGITAL SLOPE
R10 BAND 5 DIGITAL SLOPE

R20 BAND 2 FILTER GAIN
R17 BAND 3 FILTER GAIN
R14 BAND 4 FILTER GAIN
R89 BAND 5 FILTER GAIN

YIG GAINS PC BOARD 1A2A3A3

DIGITAL DISPLAY PC BOARD 1A2A3A4


A2A3 RANGE SWITCH
RF RANGE (GHz)
.001 2.0 1.8 4.0 3.3 8.3 5.4 12.4 10 22
ON FULL
OFF RANGE
1F 1R 2F 2R 3F 3R 4F 4R 5F 5R 6F 6R 7F 7R 8F 8R 9F 9R
A1 YIG FM TUNING DRIVE
A2 YIG OFFSETS
A3 YIG GAINS
A4 DIGITAL DISPLAY
TP1 TP2 TP3 TP4 TP5 TP6
CW
BAND 1 BAND 4 BAND 5
FULL RANGE
ON
OFF
R92,10K R93,4.99K R94,2.5K R95,4.7K R96,4.3K R97,4.7K
R73,5.49K R75,120K R74,82K
R87 1K R86 10K R85 10K

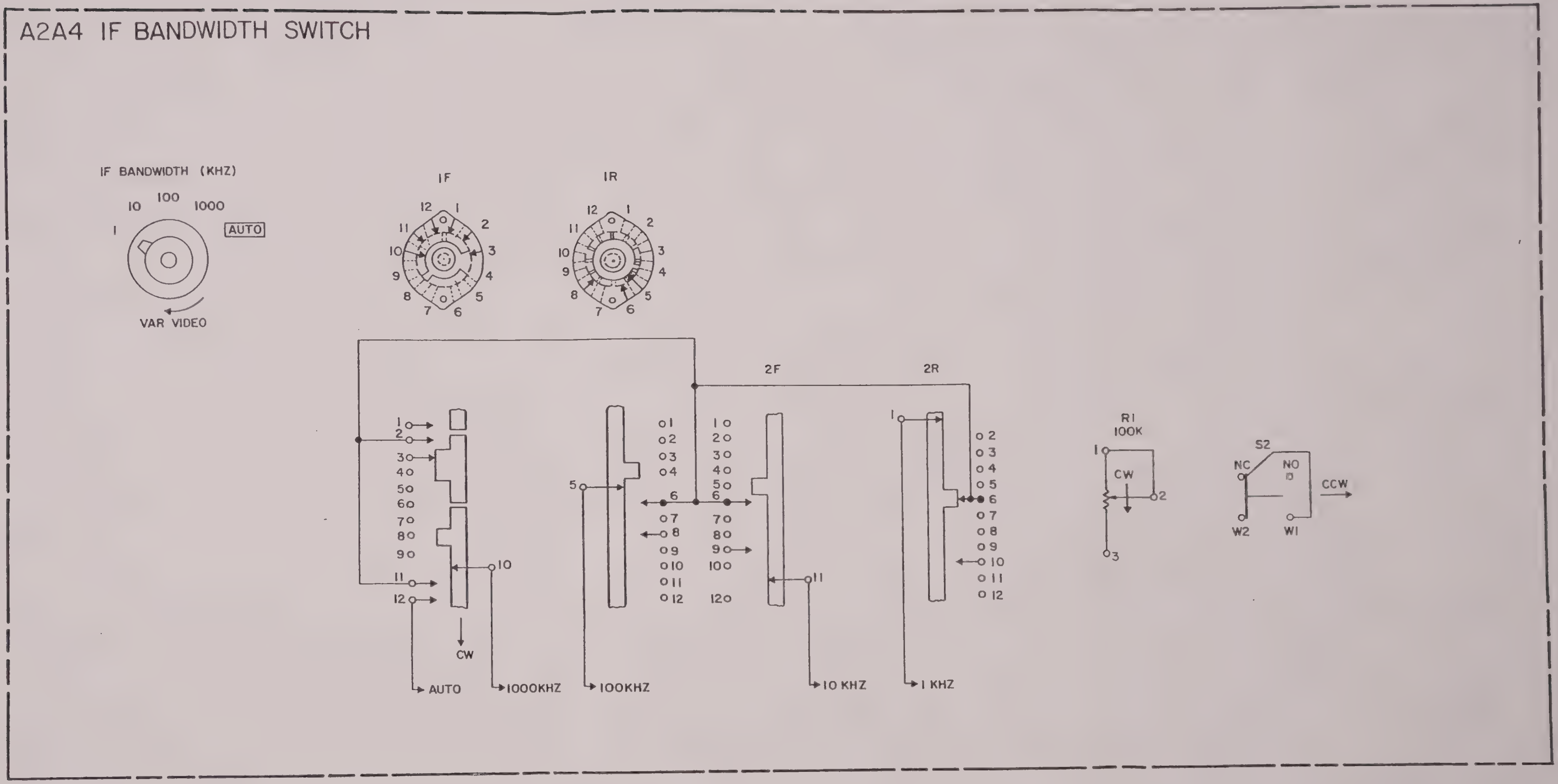
RF RANGE
(GHz)

.001–2.0
1.8–4.0
3.3–8.3
5.4–12.4
10–22

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF

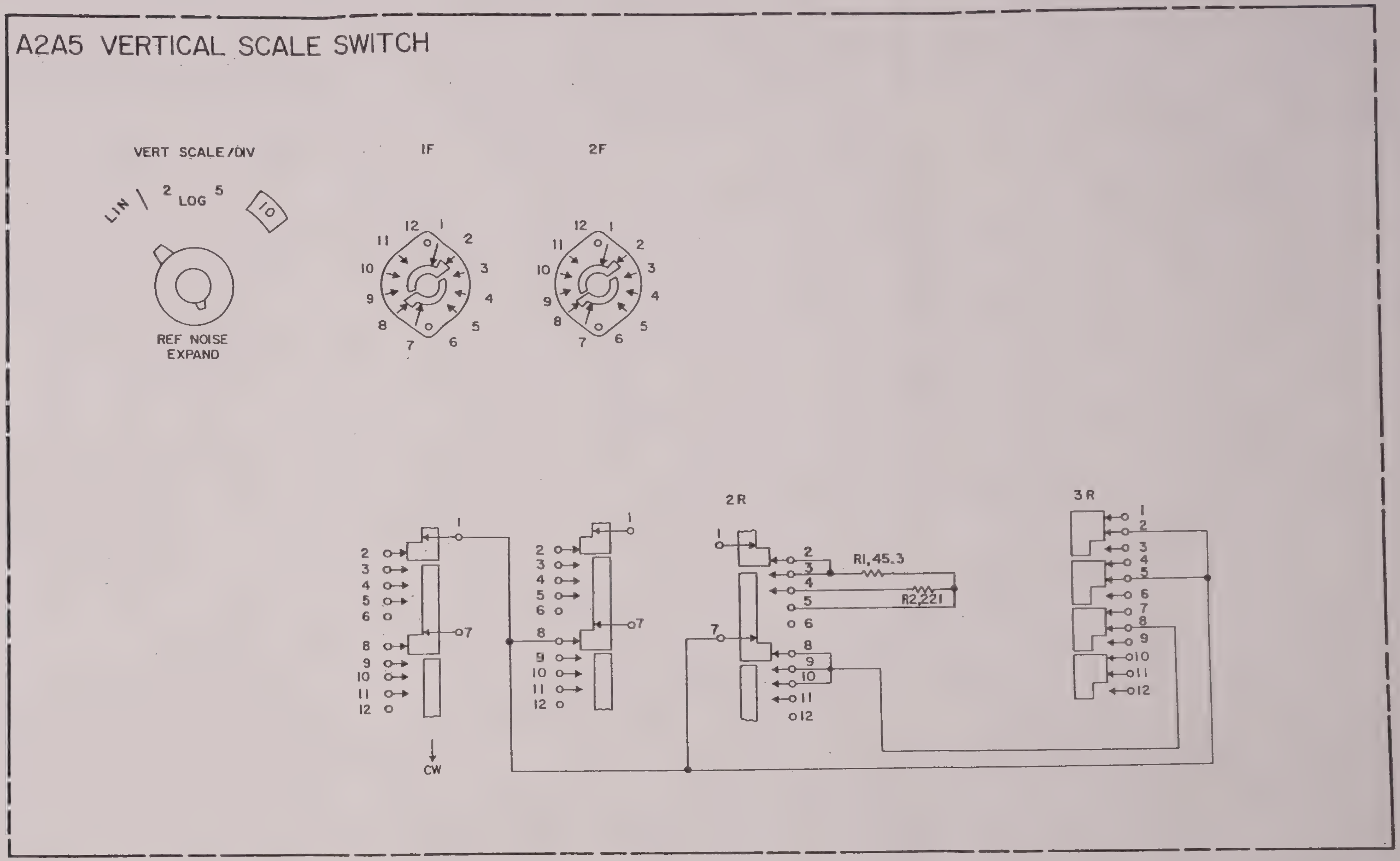
Figure 7-9. RF Range Switch Assembly 1A2A3, Maintenance Schematic Diagram

7-37/38 blank


A2A4 IF BANDWIDTH SWITCH
IF BANDWIDTH (KHZ)
1
10
100
1000
AUTO
VAR VIDEO
IF
IR
2F
2R
R1
100K
CW
S2
NC
NO
CCW
W2
W1
CW
AUTO
1000KHZ
100KHZ
10 KHZ
1 KHZ

IF BANDWIDTH
1
10
100
1000
AUTO

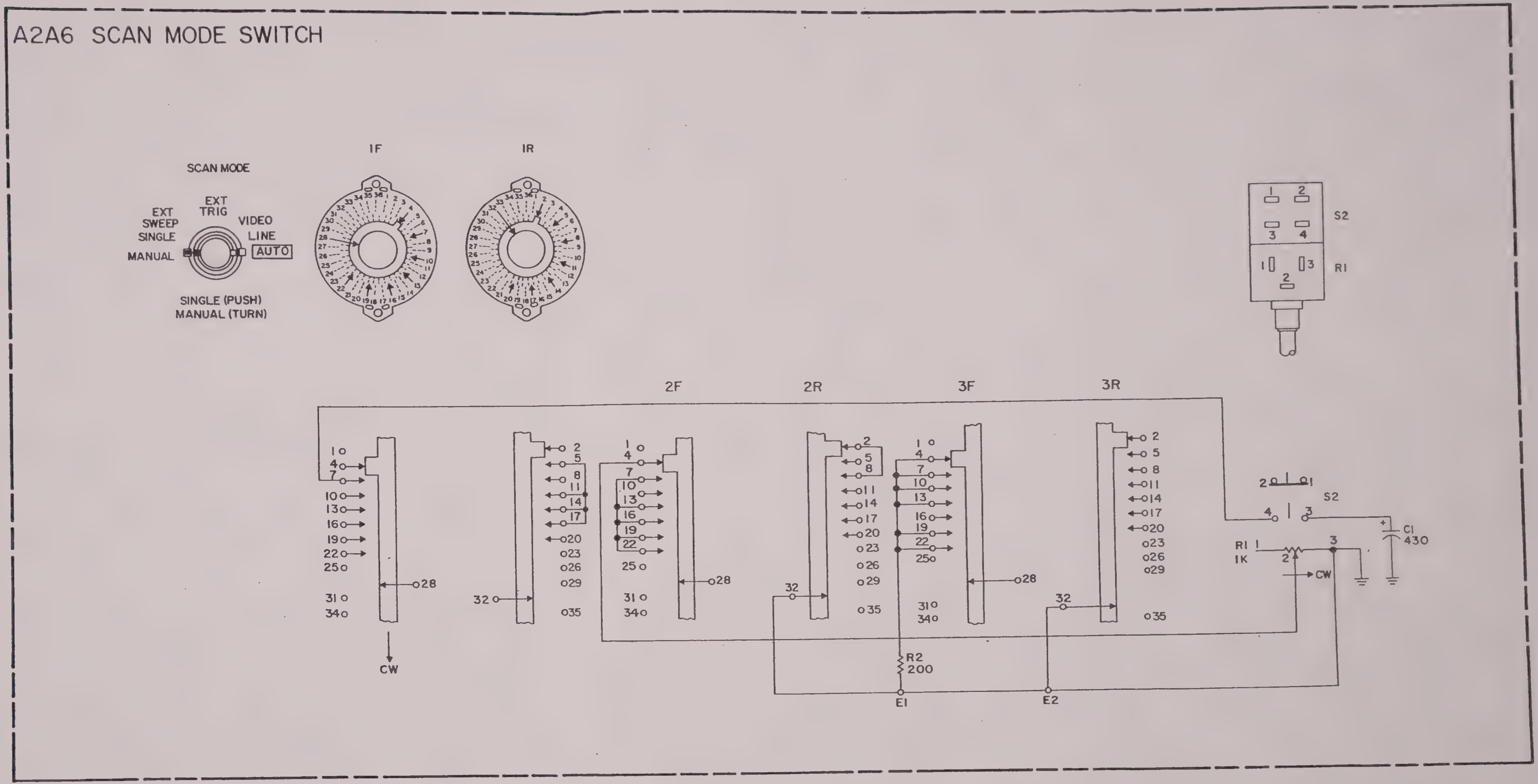
Figure 7-10. IF Bandwidth Switch Assembly 1A2A4, Maintenance Schematic Diagram


A2A5 VERTICAL SCALE SWITCH
VERT SCALE/DIV
LIN
2
LOG
5
10
REF NOISE EXPAND
1F
2F
2R
3R
R1, 45.3
R2, 221
CW

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF

VERT SCALE / DIV
LIN
2
5
10

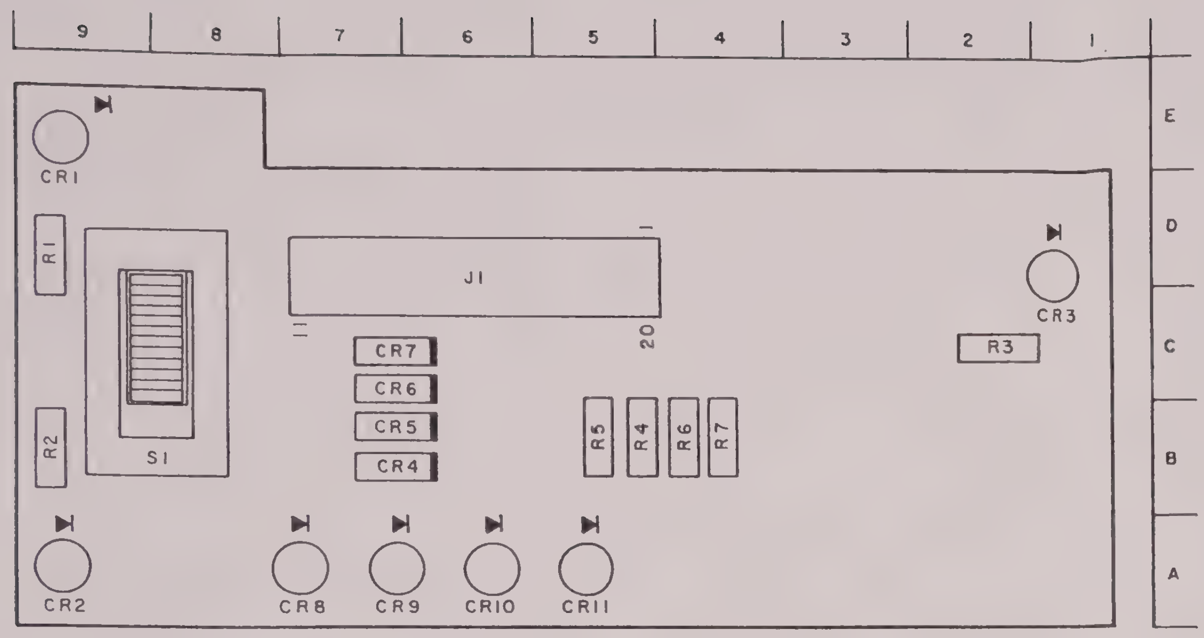
Figure 7-11. Vertical Scale Switch Assembly 1A2A5, Maintenance Schematic Diagram


A2A6 SCAN MODE SWITCH
SCAN MODE
EXT TRIG
EXT SWEEP
SINGLE
MANUAL
VIDEO
LINE
AUTO
SINGLE (PUSH)
MANUAL (TURN)
1F
1R
2F
2R
3F
3R
S2
R1
CW
R2 200
E1
E2
R1 1K
C1 430

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF

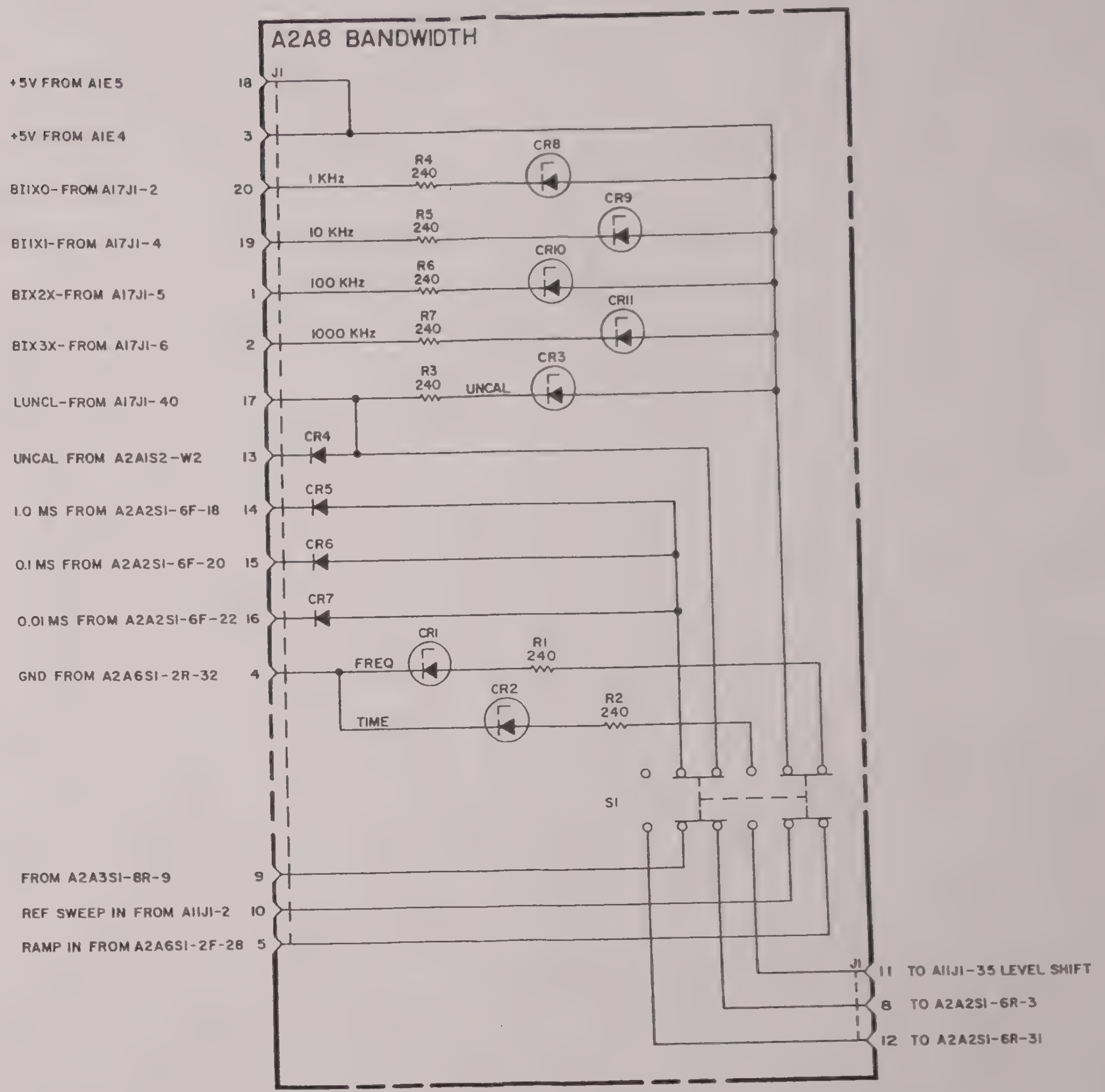
SCAN MODE
MANUAL
SINGLE
EXT. SWEEP
EXT. TRIG
VIDEO
LINE
AUTO

Figure 7-12. SCAN MODE Switch 1A2A6, Maintenance Schematic Diagram


9
8
7
6
5
4
3
2
1
E
D
C
B
A
CR1
R1
R2
S1
J1
1
20
11
CR7
CR6
CR5
CR4
R5
R4
R6
R7
R3
CR3
CR2
CR8
CR9
CR10
CR11

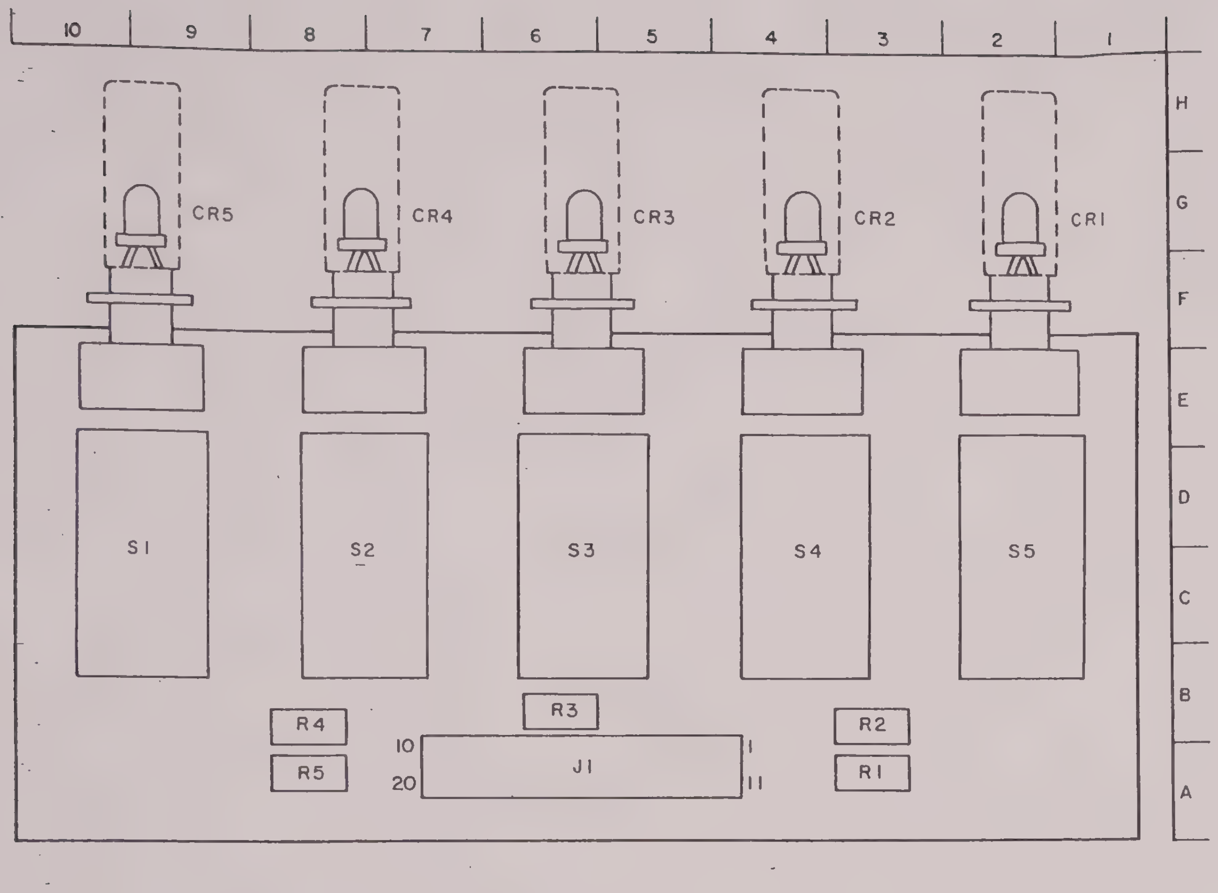
PARTS LOCATION INDEX, BANDWIDTH 1A2A8

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
CR1	9E	CR9	6A	R3	2C
CR2	9A	CR10	6A	R4	5B
CR3	1D	CR11	5A	R5	5B
CR4	7B			R6	4B
CR5	7B	J1	6D	R7	4B
CR6	7C				
CR7	7C	R1	9D	S1	8C
CR8	7A	R2	9B		


A2A8 BANDWIDTH
J1
+5V FROM A1E5
18
+5V FROM A1E4
3
B11X0- FROM A17J1-2
20
B11X1- FROM A17J1-4
19
B1X2X- FROM A17J1-5
1
B1X3X- FROM A17J1-6
2
LUNCL- FROM A17J1-40
17
UNCAL FROM A2A1S2-W2
13
1.0 MS FROM A2A2S1-6F-18
14
0.1 MS FROM A2A2S1-6F-20
15
0.01 MS FROM A2A2S1-6F-22
16
GND FROM A2A6S1-2R-32
4
1 KHz
10 KHz
100 KHz
1000 KHz
R4 240
R5 240
R6 240
R7 240
R3 240
UNCAL
CR8
CR9
CR10
CR11
CR3
CR4
CR5
CR6
CR7
CR1
FREQ
R1 240
CR2
TIME
R2 240
S1
FROM A2A3S1-8R-9
9
REF SWEEP IN FROM A11J1-2
10
RAMP IN FROM A2A6S1-2F-28
5
J1
11 TO A11J1-35 LEVEL SHIFT
8 TO A2A2S1-6R-3
12 TO A2A2S1-6R-31

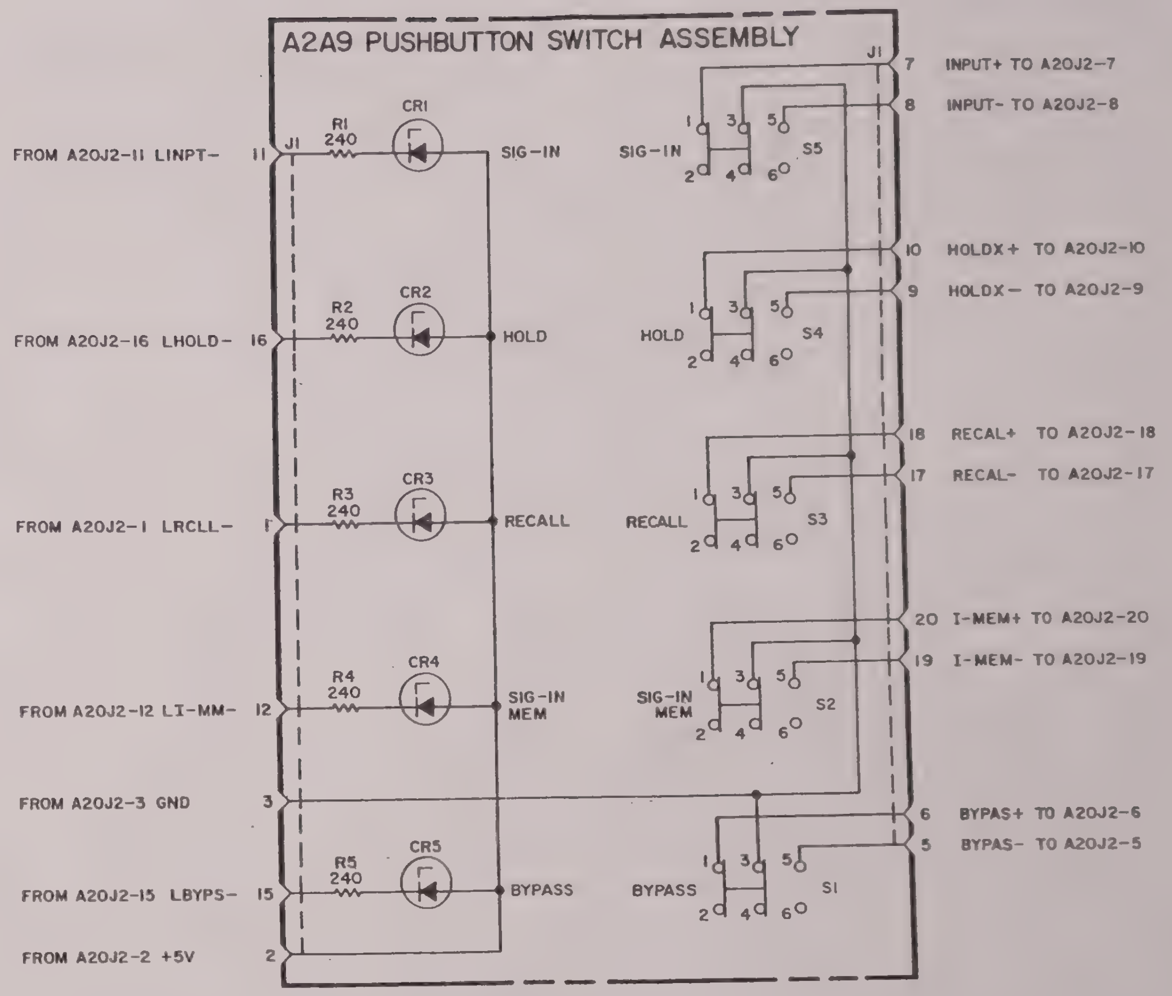
NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF

Figure 7-13. Bandwidth Printed Circuit Board 1A2A8, Maintenance Schematic Diagram


10
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
CR5
CR4
CR3
CR2
CR1
S1
S2
S3
S4
S5
R4
R5
R3
R2
R1
J1
10
20
1
11

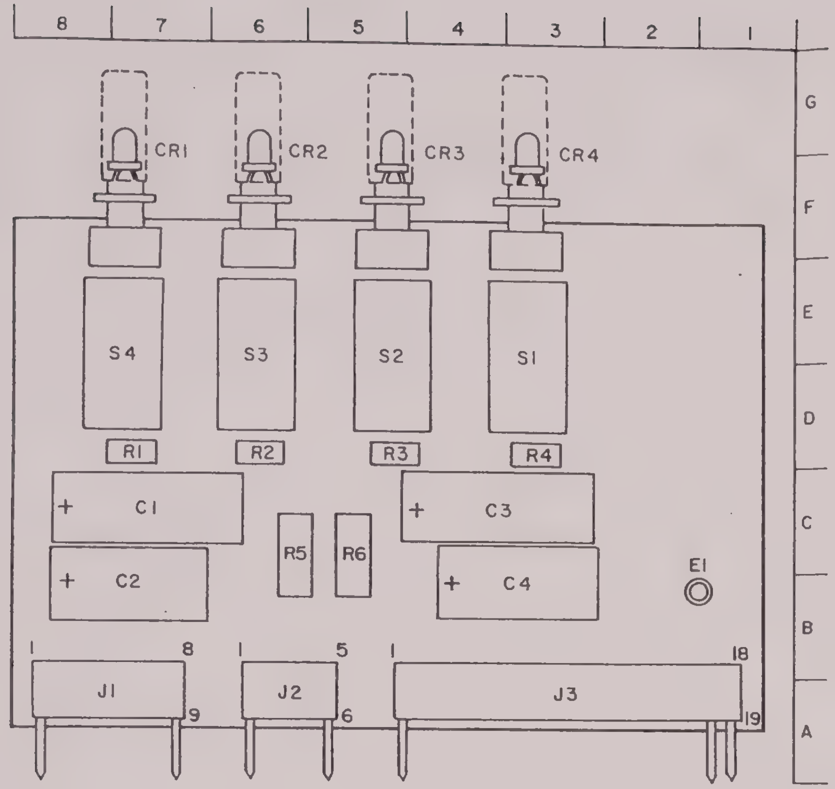
PARTS LOCATION INDEX, PUSHBUTTON SWITCH, 5 FUNCTION, 1A2A9

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
CR1	2G	R3	6B
CR2	4G	R4	8B
CR3	6G	R5	8A
CR4	8G		
CR5	9G	S1	9D
		S2	8D
J1	6A	S3	6D
R1	3A	S4	4D
R2	3B	S5	2D


A2A9 PUSHBUTTON SWITCH ASSEMBLY
J1
FROM A20J2-11 LINPT- 11
FROM A20J2-16 LHOLD- 16
FROM A20J2-1 LRCLL- 1
FROM A20J2-12 LI-MM- 12
FROM A20J2-3 GND 3
FROM A20J2-15 LBYPS- 15
FROM A20J2-2 +5V 2
R1 240
R2 240
R3 240
R4 240
R5 240
CR1
CR2
CR3
CR4
CR5
SIG-IN
HOLD
RECALL
SIG-IN MEM
BYPASS
S5
S4
S3
S2
S1
1
2
3
4
5
6
7 INPUT+ TO A20J2-7
8 INPUT- TO A20J2-8
10 HOLDX+ TO A20J2-10
9 HOLDX- TO A20J2-9
18 RECAL+ TO A20J2-18
17 RECAL- TO A20J2-17
20 I-MEM+ TO A20J2-20
19 I-MEM- TO A20J2-19
6 BYPAS+ TO A20J2-6
5 BYPAS- TO A20J2-5

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF

Figure 7-14. Pushbutton Switch Assembly 1A2A9, Maintenance Schematic Diagram


8
7
6
5
4
3
2
1
G
F
E
D
C
B
A
CR1
CR2
CR3
CR4
S4
S3
S2
S1
R1
R2
R3
R4
C1
C3
C2
C4
R5
R6
E1
1
8
9
J1
1
5
6
J2
1
18
19
J3

PARTS LOCATION INDEX, PUSHBUTTON SWITCH, 4 FUNCTION, 1A2A10

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	7C	J3	3A
C2	7B		
C3	4C	R1	7D
C4	4B	R2	6D
		R3	5D
CR1	7F	R4	3D
CR2	6F	R5	6C
CR3	5F	R6	5C
CR4	3F		
		S1	3E
E1	2B	S2 1	5E
		S3	6E
J1	7A	S4	7E
J2	6A		

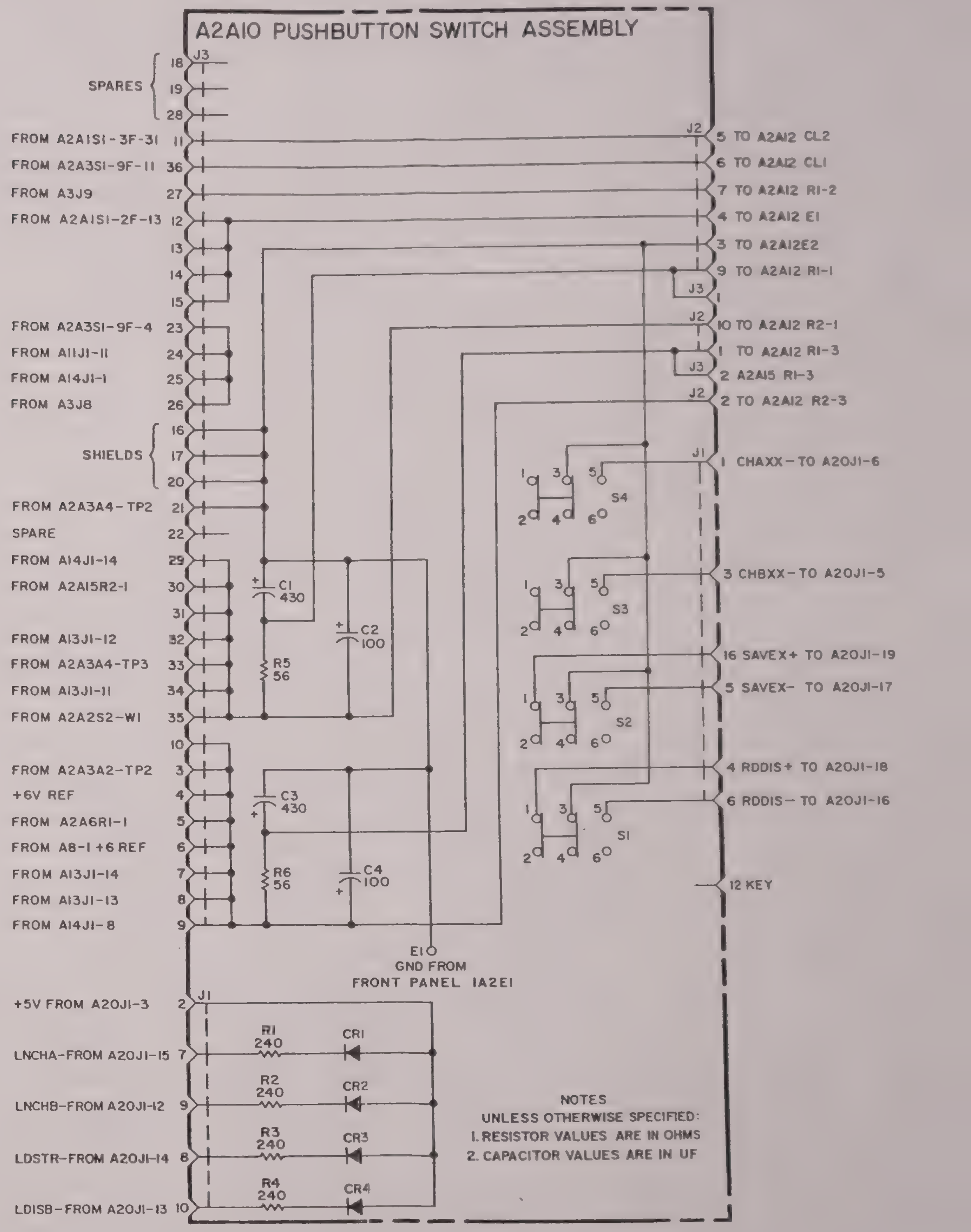
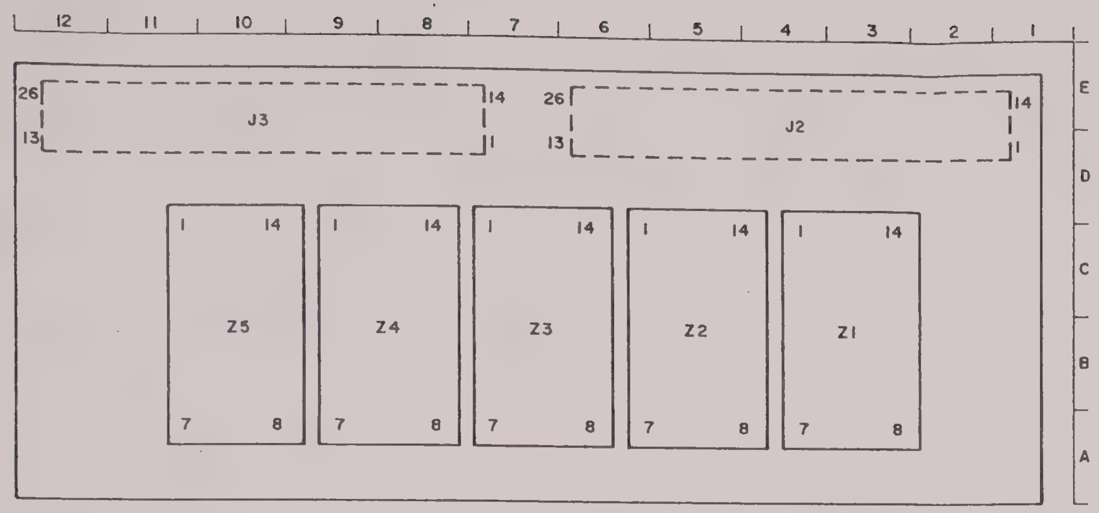

A2A10 PUSHBUTTON SWITCH ASSEMBLY
J3
SPARES
18
19
28
FROM A2A1S1-3F-31 11
FROM A2A3S1-9F-11 36
FROM A3J9 27
FROM A2A1S1-2F-13 12
13
14
15
FROM A2A3S1-9F-4 23
FROM A11J1-11 24
FROM A14J1-1 25
FROM A3J8 26
SHIELDS
16
17
20
FROM A2A3A4-TP2 21
SPARE 22
FROM A14J1-14 29
FROM A2A15R2-1 30
31
FROM A13J1-12 32
FROM A2A3A4-TP3 33
FROM A13J1-11 34
FROM A2A2S2-W1 35
10
FROM A2A3A2-TP2 3
+6V REF 4
FROM A2A6R1-1 5
FROM A8-1 +6 REF 6
FROM A13J1-14 7
FROM A13J1-13 8
FROM A14J1-8 9
C1 430
C2 100
R5 56
C3 430
C4 100
R6 56
E1
GND FROM
FRONT PANEL 1A2E1
J1
+5V FROM A20J1-3 2
LNCHA-FROM A20J1-15 7
LNCHB-FROM A20J1-12 9
LDSTR-FROM A20J1-14 8
LDISB-FROM A20J1-13 10
R1 240
R2 240
R3 240
R4 240
CR1
CR2
CR3
CR4
J2
5 TO A2A12 CL2
6 TO A2A12 CL1
7 TO A2A12 R1-2
4 TO A2A12 E1
3 TO A2A12E2
9 TO A2A12 R1-1
J3
1
J2
10 TO A2A12 R2-1
1 TO A2A12 R1-3
J3
2 A2A15 R1-3
J2
2 TO A2A12 R2-3
J1
1 CHAXX-TO A20J1-6
3 CHBXX-TO A20J1-5
16 SAVEX+ TO A20J1-19
5 SAVEX- TO A20J1-17
4 RDDIS+ TO A20J1-18
6 RDDIS- TO A20J1-16
12 KEY
S4
S3
S2
S1
1
2
3
4
5
6
NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF

Figure 7-15. Pushbutton Switch Assembly 1A2A10, Maintenance Schematic Diagram


12
11
10
9
8
7
6
5
4
3
2
1
E
D
C
B
A
26
13
J3
14
1
26
13
J2
14
1
Z5
Z4
Z3
Z2
Z1
1
14
7
8

PARTS LOCATION INDEX, FREQUENCY READOUT 1A2A11

REFERENCE DESIGNATION	ZONE
J2	4E
J3	10E
Z1	3B
Z2	5B
Z3	7B
Z4	8B
Z5	10B

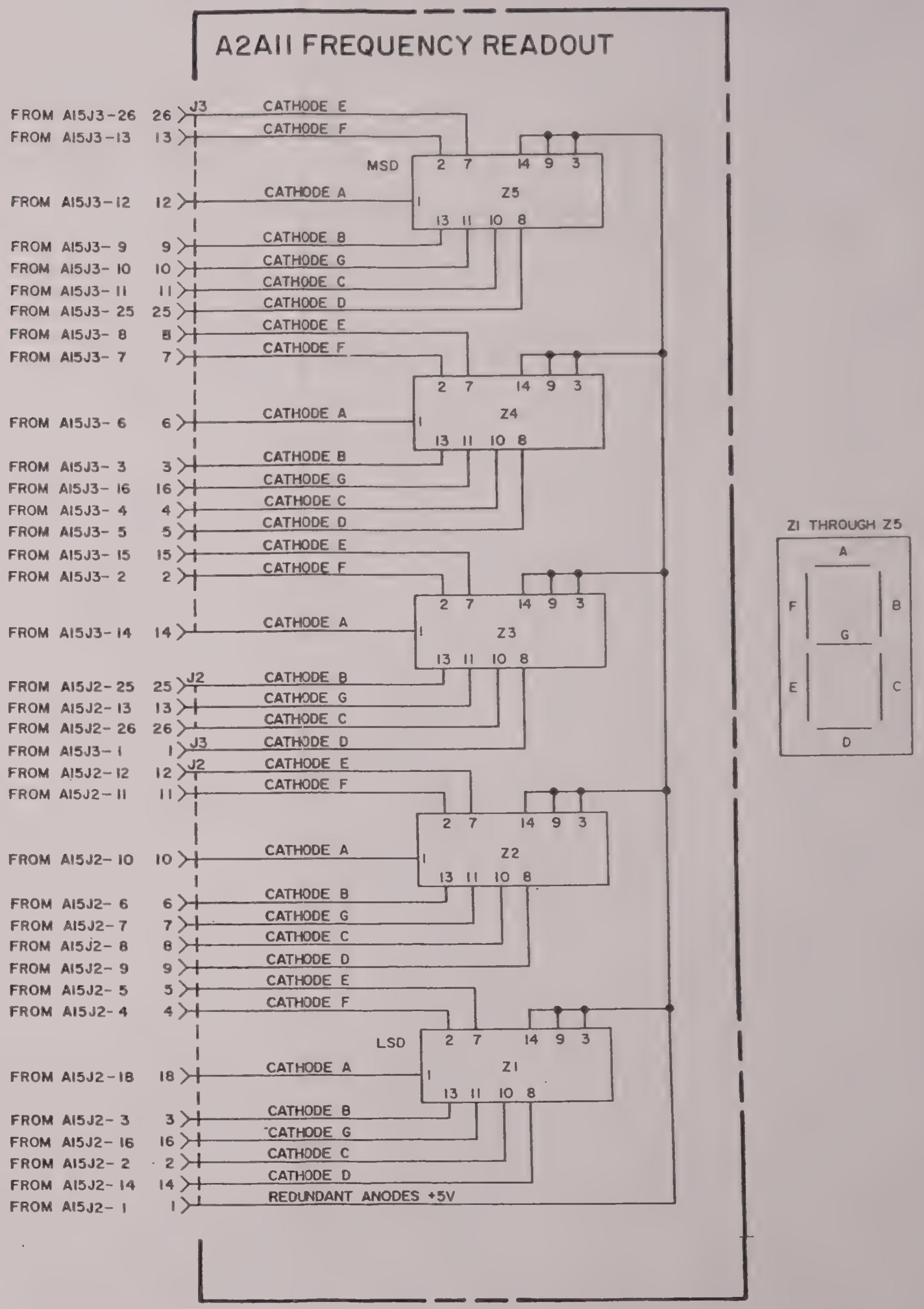
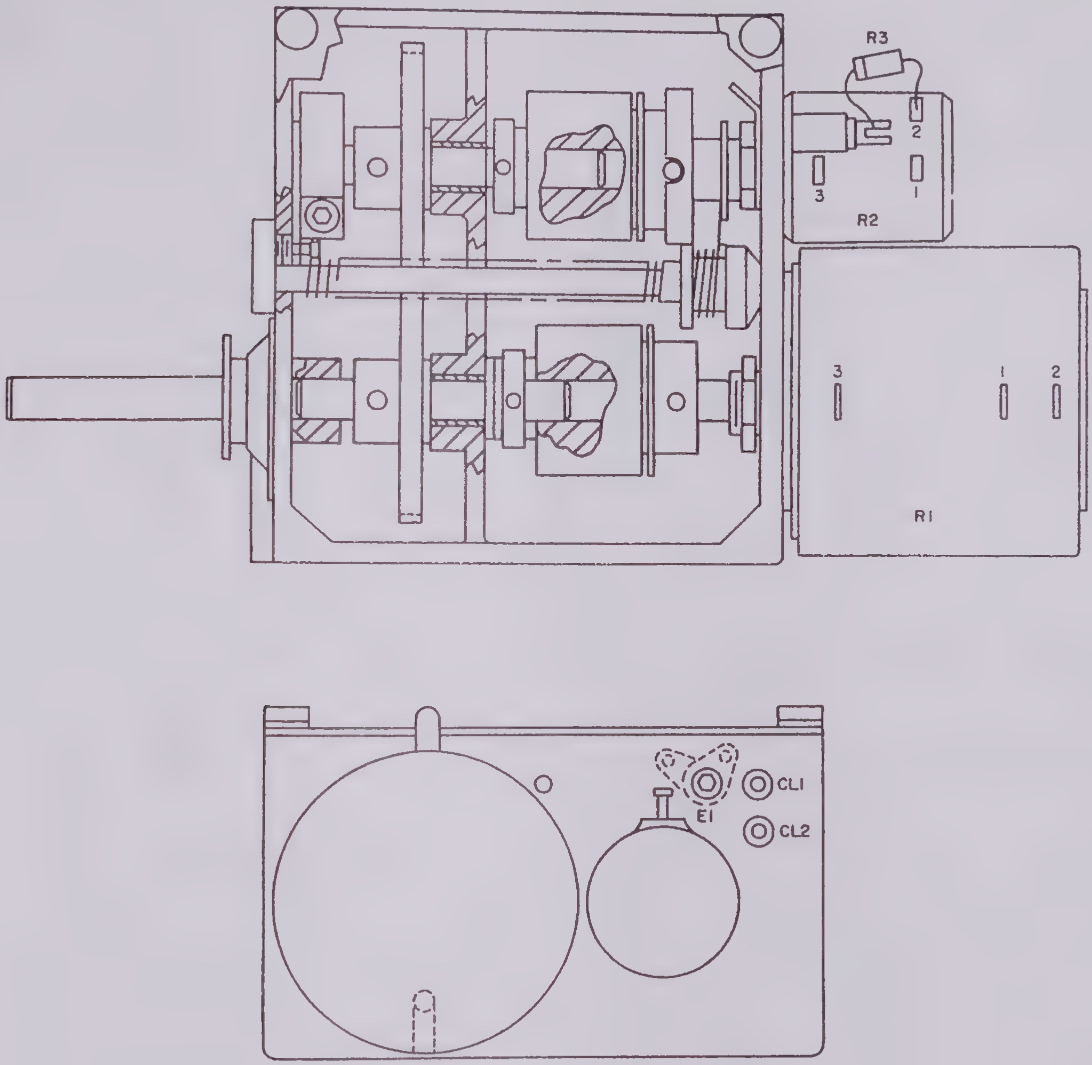

A2A11 FREQUENCY READOUT
FROM A15J3-26 26 J3 CATHODE E
FROM A15J3-13 13 CATHODE F
MSD
FROM A15J3-12 12 CATHODE A
Z5
FROM A15J3- 9 9 CATHODE B
FROM A15J3- 10 10 CATHODE G
FROM A15J3- 11 11 CATHODE C
FROM A15J3- 25 25 CATHODE D
FROM A15J3- 8 8 CATHODE E
FROM A15J3- 7 7 CATHODE F
FROM A15J3- 6 6 CATHODE A
Z4
FROM A15J3- 3 3 CATHODE B
FROM A15J3- 16 16 CATHODE G
FROM A15J3- 4 4 CATHODE C
FROM A15J3- 5 5 CATHODE D
FROM A15J3- 15 15 CATHODE E
FROM A15J3- 2 2 CATHODE F
FROM A15J3- 14 14 CATHODE A
Z3
FROM A15J2- 25 25 J2 CATHODE B
FROM A15J2- 13 13 CATHODE G
FROM A15J2- 26 26 CATHODE C
FROM A15J3- 1 1 J3 CATHODE D
FROM A15J2- 12 12 J2 CATHODE E
FROM A15J2- 11 11 CATHODE F
FROM A15J2- 10 10 CATHODE A
Z2
FROM A15J2- 6 6 CATHODE B
FROM A15J2- 7 7 CATHODE G
FROM A15J2- 8 8 CATHODE C
FROM A15J2- 9 9 CATHODE D
FROM A15J2- 5 5 CATHODE E
FROM A15J2- 4 4 CATHODE F
LSD
FROM A15J2-18 18 CATHODE A
Z1
FROM A15J2- 3 3 CATHODE B
FROM A15J2- 16 16 CATHODE G
FROM A15J2- 2 2 CATHODE C
FROM A15J2- 14 14 CATHODE D
FROM A15J2- 1 1 REDUNDANT ANODES +5V
2 7 14 9 3
1
13 11 10 8
Z1 THROUGH Z5
A
F
B
G
E
C
D

Figure 7-16. Frequency Readout Printed Circuit Board 1A2A11, Maintenance Schematic Diagram


R3
2
3
1
R2
3
1
2
R1
CL1
E1
CL2

WIRE TERMINATION			
FROM	TO	COLOR	TO
R1-3	P1-1	BROWN	A2A10J2-1
R2-3	P1-2	RED	A2A10J2-2
E1	P1-4	YELLOW	A2J5-39
E2	P1-3	YELLOW	A2J5-38
CL2	P1-5	GREEN	A2A10J2-5
CL1	P1-6	BLUE	A2A10J2-6
R1-2	P1-7	VIOLET	A2A10J2-7
R1-1	P1-9	WHITE	A2A10J2-9
R2-1	P1-10	WHT/BLK.	A2A10J2-10

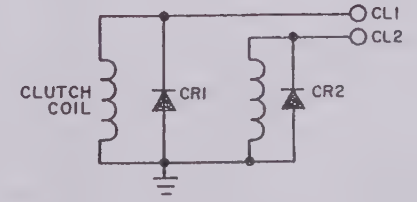
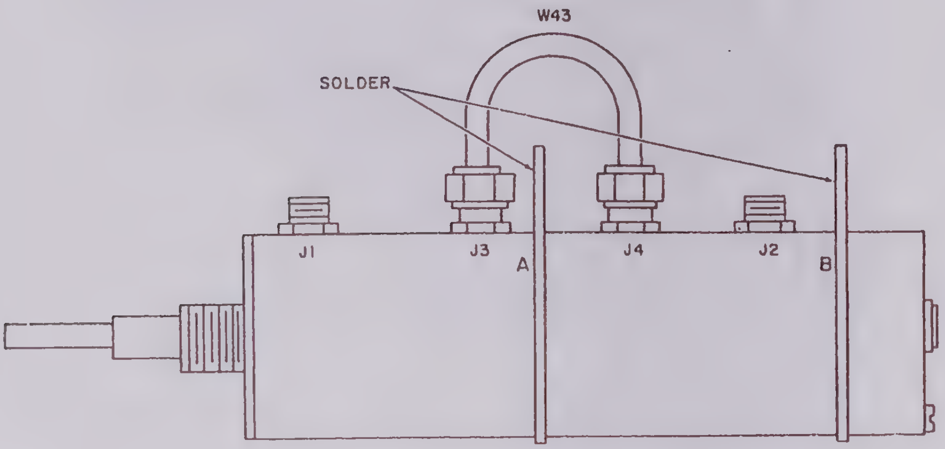

CL1
CL2
CLUTCH COIL
CR1
CR2

Figure 7-17. Tuner Assembly 1A2A12, Maintenance Schematic Diagram



P3 CONNECTOR CABLE TERMINATIONS			
PC BOARD	POSITION	COLOR	CONNECTOR PIN
B	9	BROWN	1
B	2	ORANGE	2
B	7	GREEN	3
B	5	VIOLET	4
B	—	WHITE	5
B	—	BROWN	6
B	—	ORANGE	7
B	C	GREEN	8
A	C	VIOLET	9
A	70	WHITE	10
A	40	BROWN	11
A	50	ORANGE	12
A	60	GREEN	13
B	1	RED	14
B	8	YELLOW	15
B	6	BLUE	16
B	4	GRAY	17
B	3	BLACK	18
—	—	RED	19
A	100	YELLOW	20
B	10	BLUE	21
A	80	GRAY	22
A	30	BLACK	23
A	20	RED	24
A	10	YELLOW	25
A	90	BLUE	26

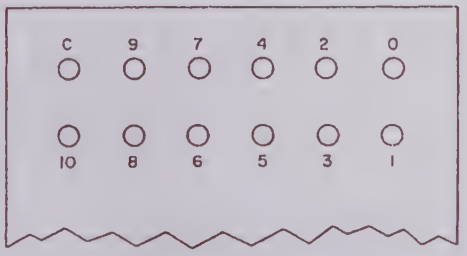

PC BOARD A AND B

Figure 7-18. IF Attenuator Assembly 1A2A13, Component Location Diagram

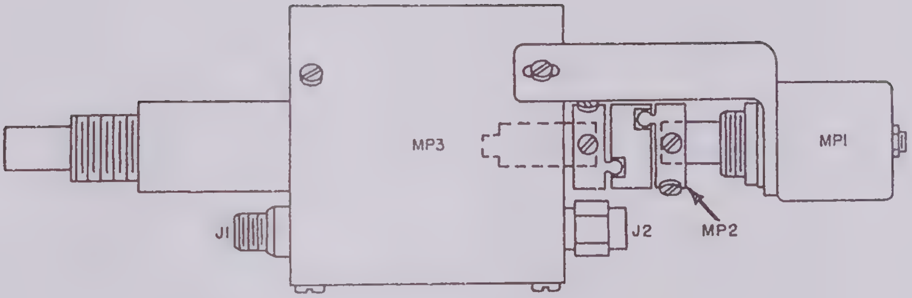

MP3
MP1
J1
J2
MP2

Figure 7-19. RF Attenuator Assembly 1A2A14, Component Location Diagram

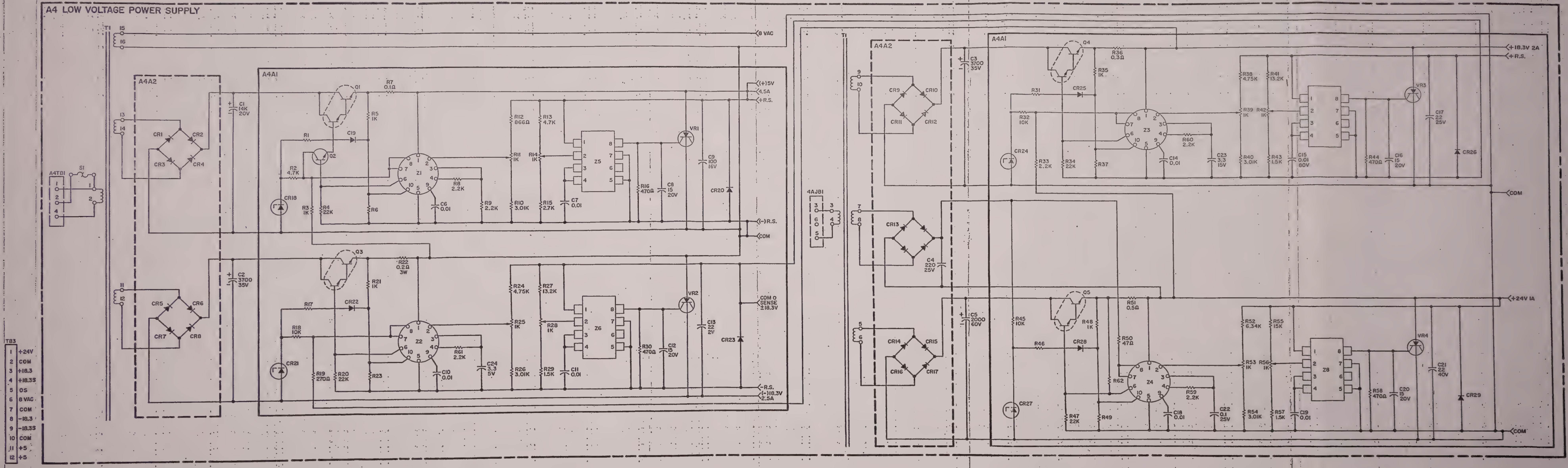
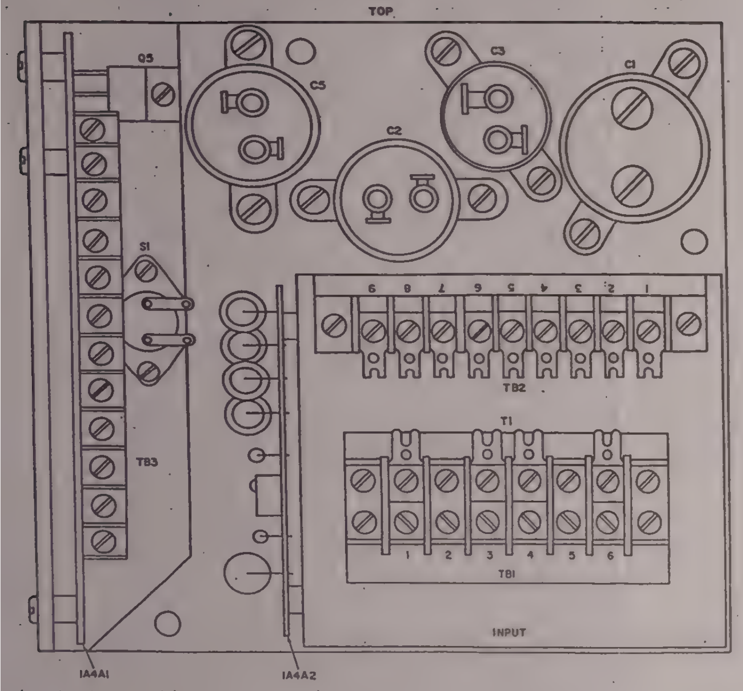
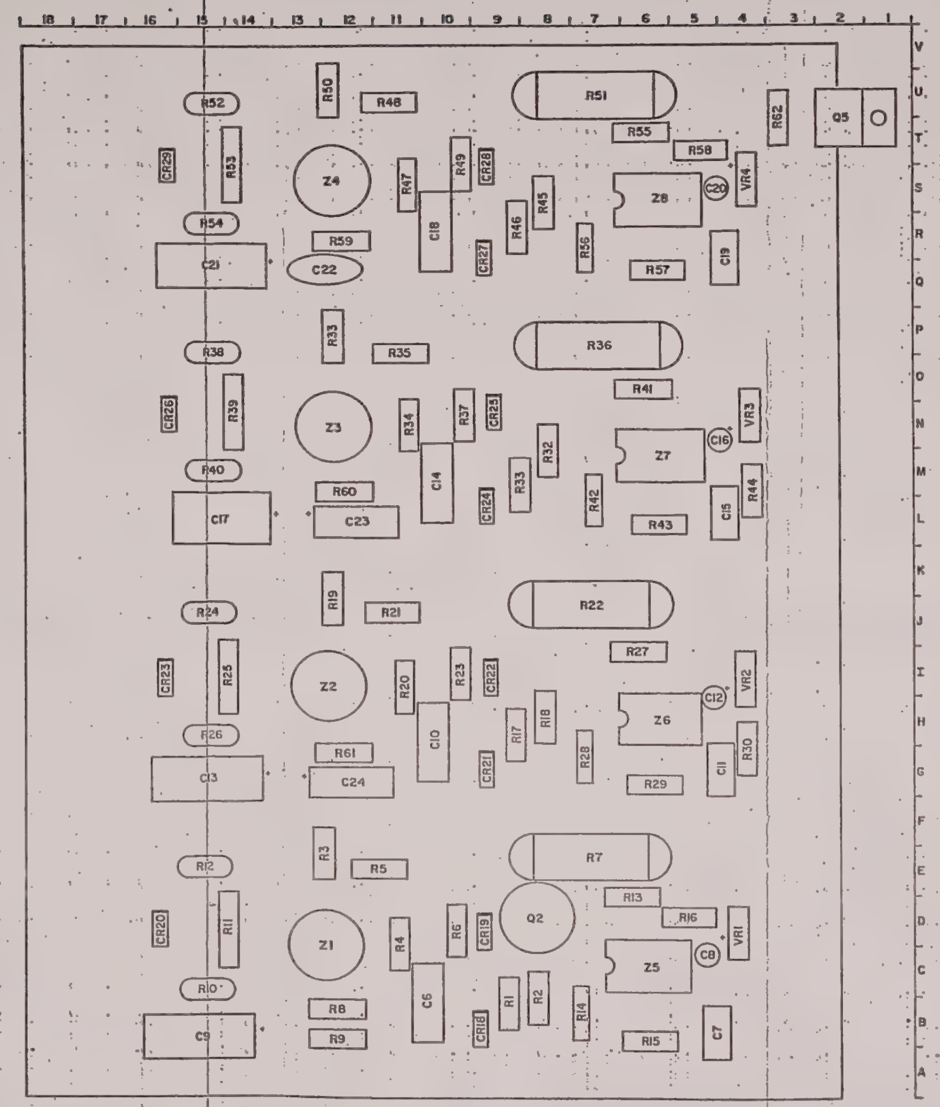

A4 LOW VOLTAGE POWER SUPPLY
T1
15
16
8 VAC
A4A2
A4A1
13
14
CR1
CR2
CR3
CR4
C1 14K 20V
A4TB1
S1
1
2
3
4
11
12
CR5
CR6
CR7
CR8
C2 3700 35V
Q1
R7 0.1Ω
R5 1K
R1
C19
Q2
R2 4.7K
CR18
R3 1K
R4 22K
R6
Z1
R8 2.2K
C6 0.01
R9 2.2K
R12 866Ω
R13 4.7K
R11 1K
R14 1K
R10 3.01K
R15 2.7K
C7 0.01
Z5
R16 470Ω
C8 15 20V
VR1
C9 100 16V
CR20
(+)5V
4.5A
+R.S.
(–)R.S.
COM
Q3
R22 0.2Ω 3W
R21 1K
R17
CR22
R18 10K
CR21
R19 270Ω
R20 22K
Z2
R23
R61 2.2K
C10 0.01
C24 3.3 5V
R24 4.75K
R27 13.2K
R25 1K
R28 1K
R26 3.01K
R29 1.5K
C11 0.01
Z6
R30 470Ω
C12 15 20V
VR2
C13 22 2V
CR23
COM 0 SENSE ±18.3V
-R.S.
(–)18.3V 2.5A
4AJB1
TB3
1 +24V
2 COM
3 +18.3
4 +18.3S
5 OS
6 8 VAC
7 COM
8 –18.3
9 –18.3S
10 COM
11 +5
12 +5
9
10
CR9
CR10
CR11
CR12
C3 3700 35V
7
8
CR13
C4 220 25V
5
6
CR14
CR15
CR16
CR17
C5 2000 60V
Q4
R36 0.3Ω
R35 1K
R31
CR25
R32 10K
CR24
R33 2.2K
R34 22K
R37
Z3
R60 2.2K
C14 0.01
C23 3.3 15V
R38 4.75K
R41 13.2K
R39 1K
R42 1K
R40 3.01K
R43 1.5K
C15 0.01 60V
R44 470Ω
C16 15 20V
VR3
C17 22 25V
CR26
+18.3V 2A
+R.S.
COM
Q5
R51 0.5Ω
R45 10K
R48 1K
R50 47Ω
R46
CR28
CR27
R62
R47 22K
R49
Z4
R59 2.2K
C18 0.01
C22 0.1 25V
R52 6.34K
R55 15K
R53 1K
R56 1K
R54 3.01K
R57 1.5K
C19 0.01
Z8
R58 470Ω
C20 15 20V
VR4
C21 22 40V
CR29
+24V 1A
COM

Figure 7-20. Low Voltage Power Supply 1A4, Maintenance Schematic Diagram (Sheet 1 of 2)


TOP
Q5
C5
C2
C3
C1
S1
TB3
TB2
T1
TB1
INPUT
1A4A1
1A4A2

PARTS LOCATION INDEX, LOW VOLTAGE POWER SUPPLY 1A4A1

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1–C5	NOT USED	R11	15D	R62	3U
C6	9B	R12	15E		
C7	4B	R13	6D	VR1	4D
C8	5C	R14	8B	VR2	4I
C9	15B	R15	6B	VR3	4N
C10	10H	R16	5D	VR4	4S
C11	5H	R17	9H		
C12	5I	R18	8H	Z1	12C
C13	15G	R19	12J	Z2	12I
C14	10M	R20	11I	Z3	12N
C15	5L	R21	11J	Z4	12S
C16	5N	R22	7J	Z5	6C
C17	15L	R23	10I	Z6	6H
C18	10R	R24	15J	Z7	6M
C19	4R	R25	15I	Z8	6S
C20	5S	R26	15H		
C21	15Q	R27	6I		
C22	12Q	R28	7H		
C23	12L	R29	6H		
C24	12H	R30	4H		
		R31	9M		
CR1–CR17	NOT USED	R32	8M		
CR18	9B	R33	12P		
CR19	9D	R34	11N		
CR20	16D	R35	11P		
CR21	9H	R36	7P		
CR22	9I	R37	10N		
CR23	16I	R38	15P		
CR24	9L	R39	14N		
CR25	9N	R40	15M		
CR26	16N	R41	6O		
CR27	9R	R42	7L		
CR28	1T	R43	6L		
CR29	16T	R44	4M		
		R45	8S		
Q1	NOT USED	R46	9R		
Q2	8D	R47	11S		
Q3	NOT USED	R48	11U		
Q4	NOT USED	R49	10T		
Q5	2U	R50	12U		
		R51	7U		
R1	9B	R52	15U		
R2	8B	R53	14T		
R3	12E	R54	15R		
R4	11D	R55	6T		
R5	11E	R56	7R		
R6	10D	R57	6Q		
R7	7E	R58	5T		
R8	12B	R59	12R		
R9	12B	R60	12M		
R10	15B	R61	12H		


18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
V
U
T
S
R
Q
P
O
N
M
L
K
J
I
H
G
F
E
D
C
B
A
Q5
R62
R52
R50
R48
R51
R55
R58
VR4
R53
CR29
Z4
R47
R49
CR28
R45
Z8
C20
R54
R59
C18
CR27
R46
R56
C19
C21
C22
R57
R33
R35
R36
R38
R41
VR3
CR26
R39
Z3
R34
R37
CR25
R32
Z7
C16
R40
C14
R33
R42
C15
R44
C17
R60
C23
CR24
R43
R19
R21
R22
R24
R27
VR2
CR23
R25
Z2
R20
R23
CR22
C12
Z6
R18
R17
C10
R28
R30
R26
R61
C11
C13
C24
CR21
R29
R7
R3
R12
R5
R13
R16
VR1
CR20
R11
Z1
R4
R6
CR19
Q2
Z5
C8
R10
C6
R1
R2
R14
C7
R8
C9
CR18
R9
R15

PARTS LOCATION INDEX, LOW VOLTAGE POWER SUPPLY 1A4A2

REFERENCE DESIGNATION	ZONE
CR1	8L
CR2	9M
CR3	12M
CR4	11L
CR5	8E
CR6	9E
CR7	12E
CR8	11E
CR9	7E
CR10	5E
CR11	4E
CR12	3E
CR13	NOT USED
CR14	4L
CR15	5L
CR16	7L
CR17	6L

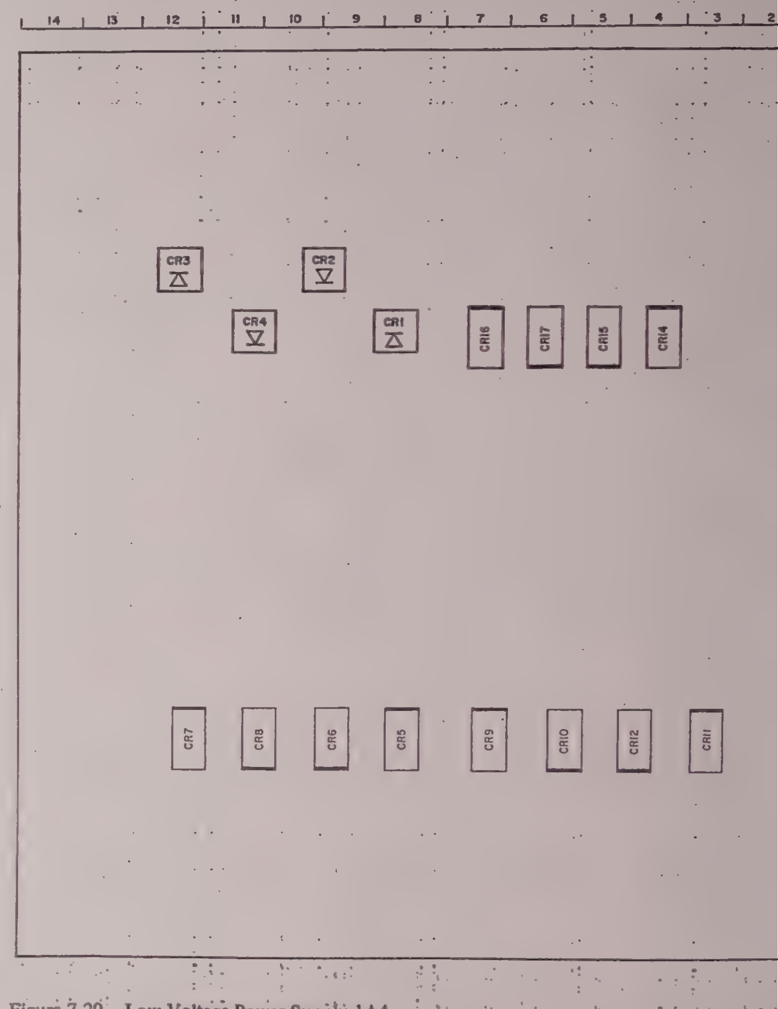

14
13
12
11
10
9
8
7
6
5
4
3
2
CR3
CR2
CR4
CR1
CR16
CR17
CR15
CR14
CR7
CR8
CR6
CR5
CR9
CR10
CR12
CR11

Figure 7-20. Low Voltage Power Supply 1A4, Maintenance Schematic Diagram (Sheet 2 of 2)

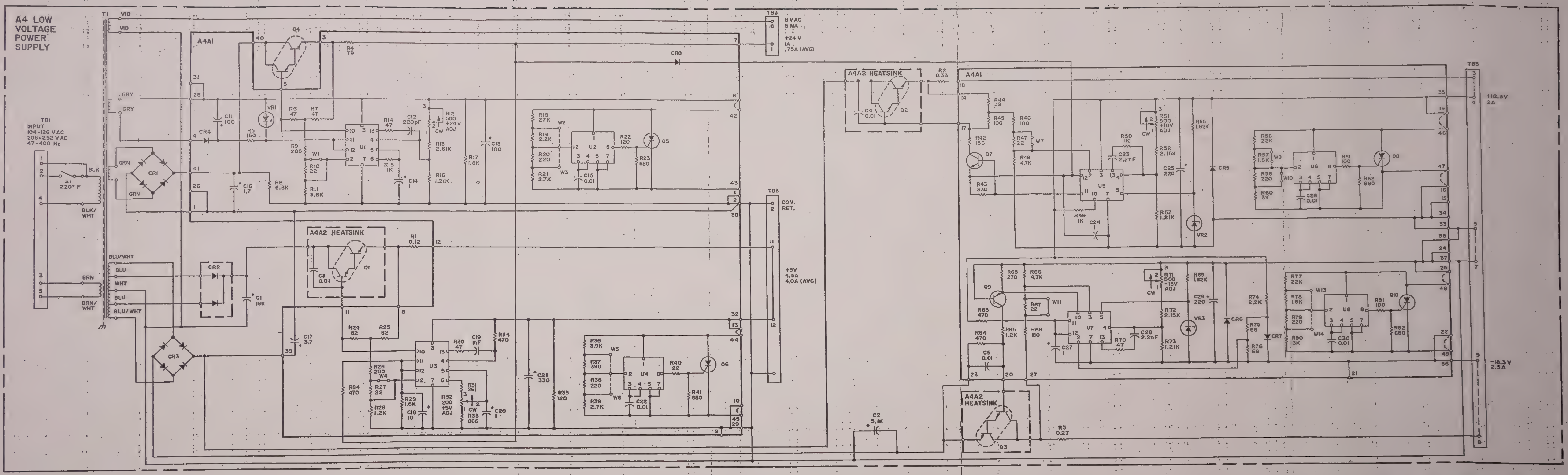
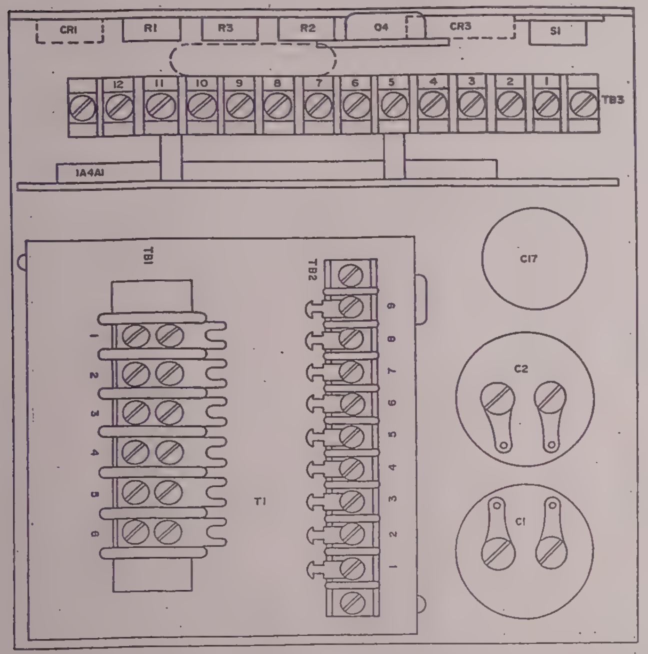
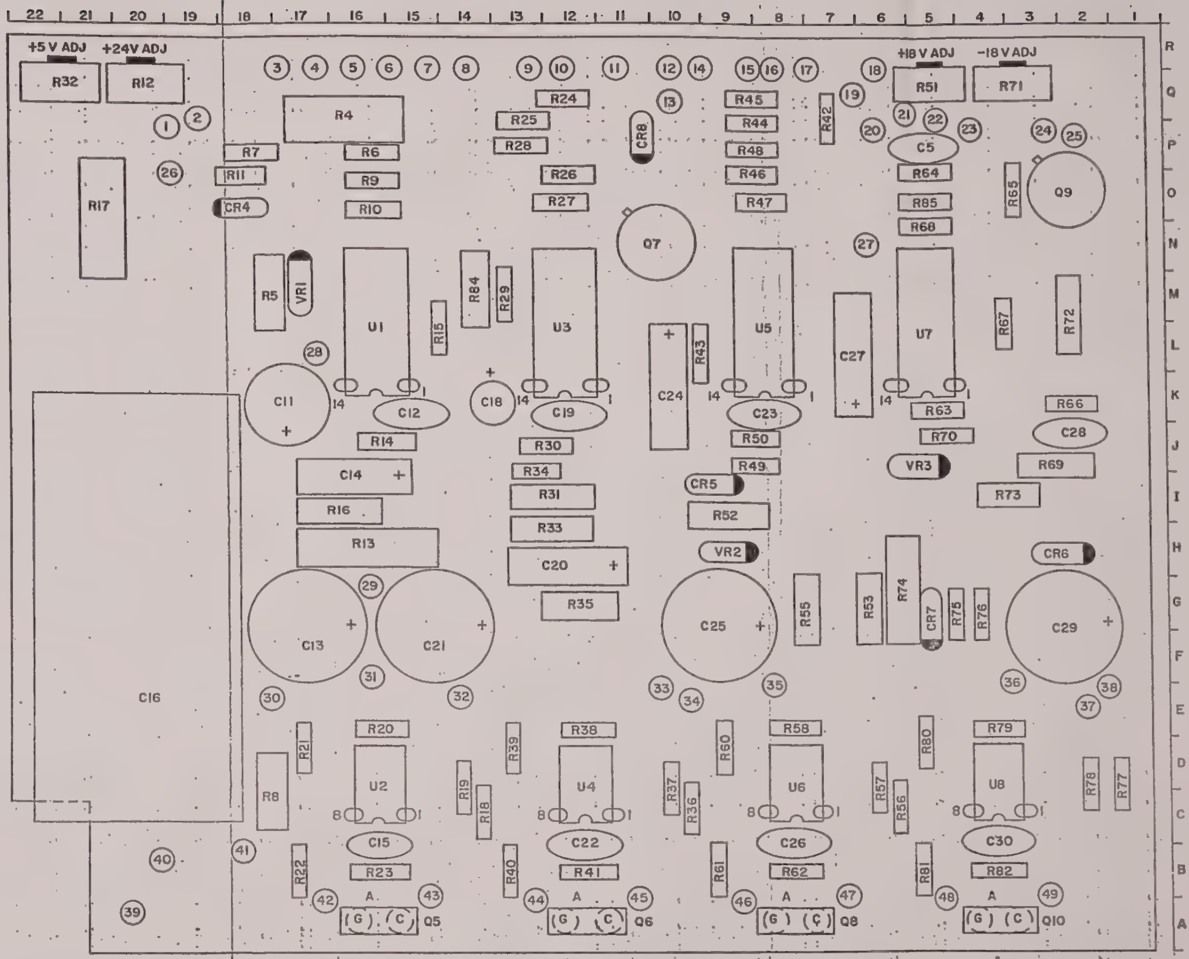

A4 LOW VOLTAGE POWER SUPPLY
T1
V10
V10
GRY
GRY
GRN
GRN
TB1
INPUT
104-126 VAC
208-252 VAC
47-400 Hz
S1
220° F
BLK
BLK/WHT
BRN
BRN/WHT
BLU/WHT
BLU
WHT
BLU
BLU/WHT
CR1
CR2
CR3
CR4
C1
16K
A4A1
Q4
R4
75
VR1
R6
47
R7
47
C11
100
R5
150
R9
200
W1
R10
22
R11
5.6K
U1
R14
47
C12
220pF
R12
500
+24 V
ADJ
CW
R13
2.61K
R15
1K
C14
1
R16
1.21K
R17
1.6K
C13
100
C16
1.7
R8
6.8K
CR8
R18
27K
W2
R19
2.2K
R20
220
R21
2.7K
W3
U2
C15
0.01
R22
120
R23
680
Q5
TB3
8 VAC
5 MA
+24 V
1A
.75A (AVG)
COM.
RET.
+5V
4.5A
4.0A (AVG)
A4A2 HEATSINK
R1
0.12
C3
0.01
Q1
R24
82
R25
82
C17
3.7
R26
200
W4
R27
22
R28
1.2K
R84
470
U3
R29
1.6K
C18
10
R30
47
C19
1nF
R34
470
R31
261
R32
200
+5V
ADJ
CW
R33
866
C20
1
C21
330
R35
120
R36
3.9K
W5
R37
390
R38
220
R39
2.7K
W6
U4
C22
0.01
R40
22
R41
680
Q6
A4A2 HEATSINK
C4
0.01
Q2
R2
0.33
A4A1
R44
39
R45
100
R46
180
R47
22
W7
R48
4.7K
R42
150
Q7
R43
330
U5
R49
1K
C24
1
R50
1K
C23
2.2nF
R51
500
+18V
ADJ
CW
R52
2.15K
R53
1.21K
C25
220
R55
1.62K
CR5
VR2
R56
22K
R57
1.8K
W9
R58
220
W10
R60
3K
U6
C26
0.01
R61
100
R62
680
Q8
+18.3V
2A
R65
270
R66
4.7K
Q9
R63
470
R67
22
W11
R64
470
C5
0.01
R85
1.2K
R68
180
U7
C27
1
R70
47
C28
2.2nF
R71
500
-18V
ADJ
CW
R72
2.15K
R73
1.21K
VR3
R69
1.62K
C29
220
CR6
R74
2.2K
R75
68
R76
68
CR7
R77
22K
R78
1.8K
W13
R79
220
R80
3K
W14
U8
C30
0.01
R81
100
R82
680
Q10
-18.3V
2.5A
A4A2 HEATSINK
Q3
R3
0.27
C2
5.1K

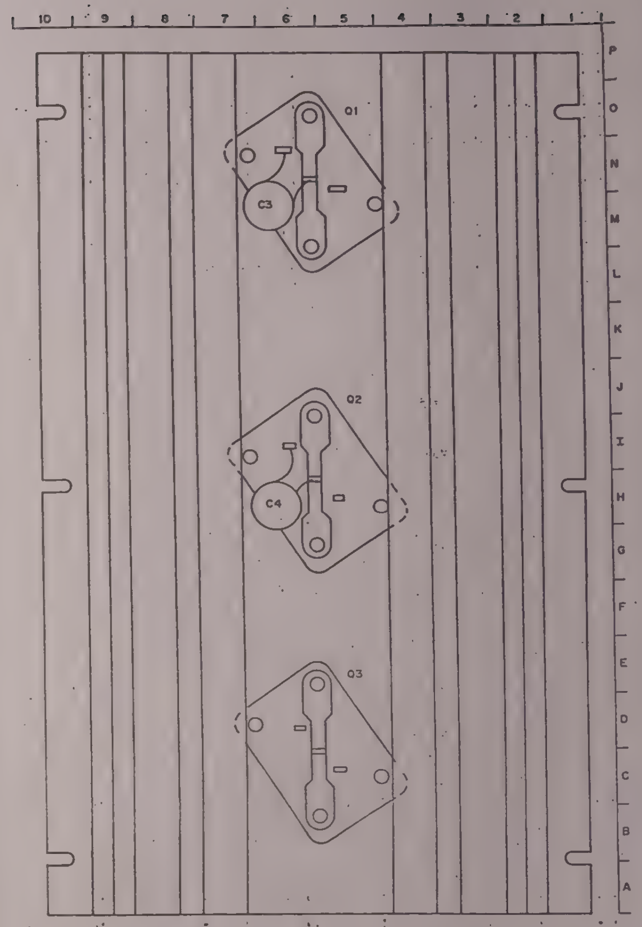
Figure 7-20A. Low Voltage Power Supply 1A4, Maintenance Schematic Diagram (Sheet 1 of 2)


CR1
R1
R3
R2
Q4
CR3
S1
12
11
10
9
8
7
6
5
4
3
2
1
TB3
1A4A1
TB1
TB2
T1
C17
C2
C1

PARTS LOCATION INDEX, LOW VOLTAGE POWER SUPPLY 1A4A1

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1–C4	NOT USED	R15	15L	R66	2K
C5	5P	R16	16I	R67	4M
C6-C10	NOT USED	R17	21O	R68	5N
C11	17K	R18	14C	R69	3J
C12	15K	R19	14D	R70	5J
C13	17G	R20	16E	R71	3Q
C14	16I	R21	17D	R72	2M
C15	16C	R22	17B	R73	3I
C16	20G	R23	16B	R74	6G
C17	NOT USED	R24	12Q	R75	5G
C18	14K	R25	13P	R76	4G
C19	12K	R26	12O	R77	1D
C20	12H	R27	12O	R78	2D
C21	15G	R28	13P	R79	4E
C22	12C	R29	13M	R80	5D
C23	8K	R30	13J	R81	5B
C24	10K	R31	12I	R82	4B
C25	9G	R32	21Q	R83–R84	NOT USED
C26	8C	R33	12H	R85	5O
C27	7L	R34	13J		
C28	2J	R35	12G	VR1	17M
C29	2G	R36	10C	VR2	9H
C30	4C	R37	10D	VR3	5J
		R38	12E		
CR1–CR3	NOT USED	R39	13D		
CR4	18O	R40	13B		
CR5	9I	R41	12B		
CR6	2H	R42	7Q		
CR7	5G	R43	10L		
CR8	11P	R44	8P		
		R45	8Q		
Q1–Q4	NOT USED	R46	8O		
Q5	16A	R47	8O		
Q6	12A	R48	8P		
Q7	10N	R49	8J		
Q8	8A	R50	8J		
Q9	2O	R51	5Q		
Q10	4A	R52	9I		
		R53	6G		
R1–R3	NOT USED	R54	NOT USED		
R4	16Q	R55	8G		
R5	18M	R56	6C		
R6	16P	R57	6D		
R7	18P	R58	8E		
R8	18C	R59	NOT USED		
R9	16O	R60	9D		
R10	16O	R61	9B		
R11	18O	R62	8B		
R12	20Q	R63	5K		
R13	16H	R64	5O		
R14	16J	R65	3O		


22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
R
Q
P
O
N
M
L
K
J
I
H
G
F
E
D
C
B
A
+5 V ADJ
+24V ADJ
+18 V ADJ
-18 V ADJ
R32
R12
R4
R24
R25
R28
R26
R27
R7
R6
R9
R10
R11
CR4
CR8
R45
R44
R48
R46
R47
R42
R51
R71
C5
R64
R65
R85
R68
R63
Q7
Q9
R17
R5
VR1
U1
R15
R84
R29
U3
U5
U7
C27
R43
R67
R72
C11
C12
C18
C19
C24
C23
R14
R30
R50
R34
R49
R70
R66
C28
C14
R31
CR5
R52
VR3
R69
R73
R16
R33
VR2
CR6
R13
C20
C13
C21
R35
C25
R55
R53
R74
CR7
R75
R76
C29
C16
R20
R21
R39
R36
R37
R60
R58
R80
R79
R78
R77
R8
U2
R19
R18
U4
R38
U6
R57
R56
U8
C15
C22
C26
C30
R23
R41
R62
R82
R22
R40
R61
R81
Q5
Q6
Q8
Q10
G
C
A


10
9
8
7
6
5
4
3
2
1
P
O
N
M
L
K
J
I
H
G
F
E
D
C
B
A
Q1
C3
Q2
C4
Q3

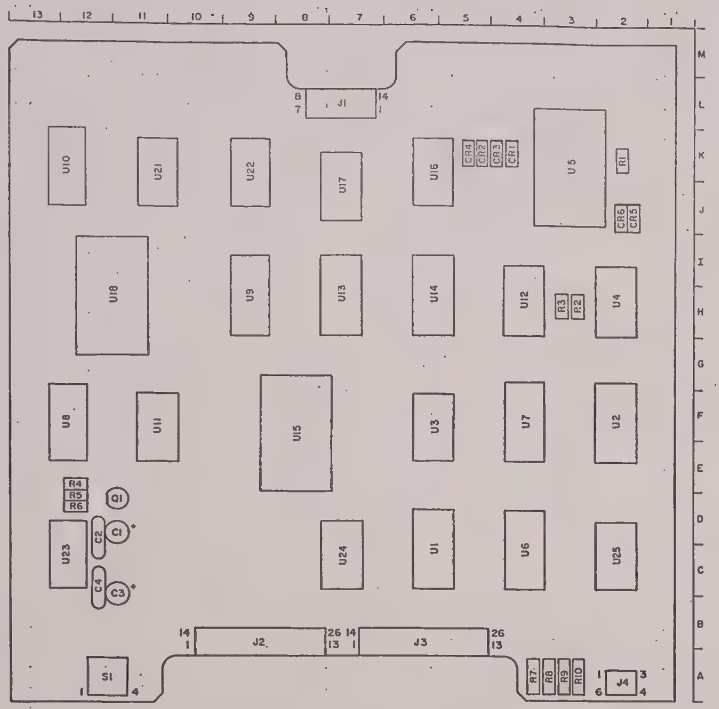
PARTS LOCATION INDEX, LOW VOLTAGE POWER SUPPLY 1A4A2

REFERENCE DESIGNATION	ZONE
C1–C2	NOT USED
C3	5M
C4	5H
Q1	5N
Q2	5H
Q3	5D

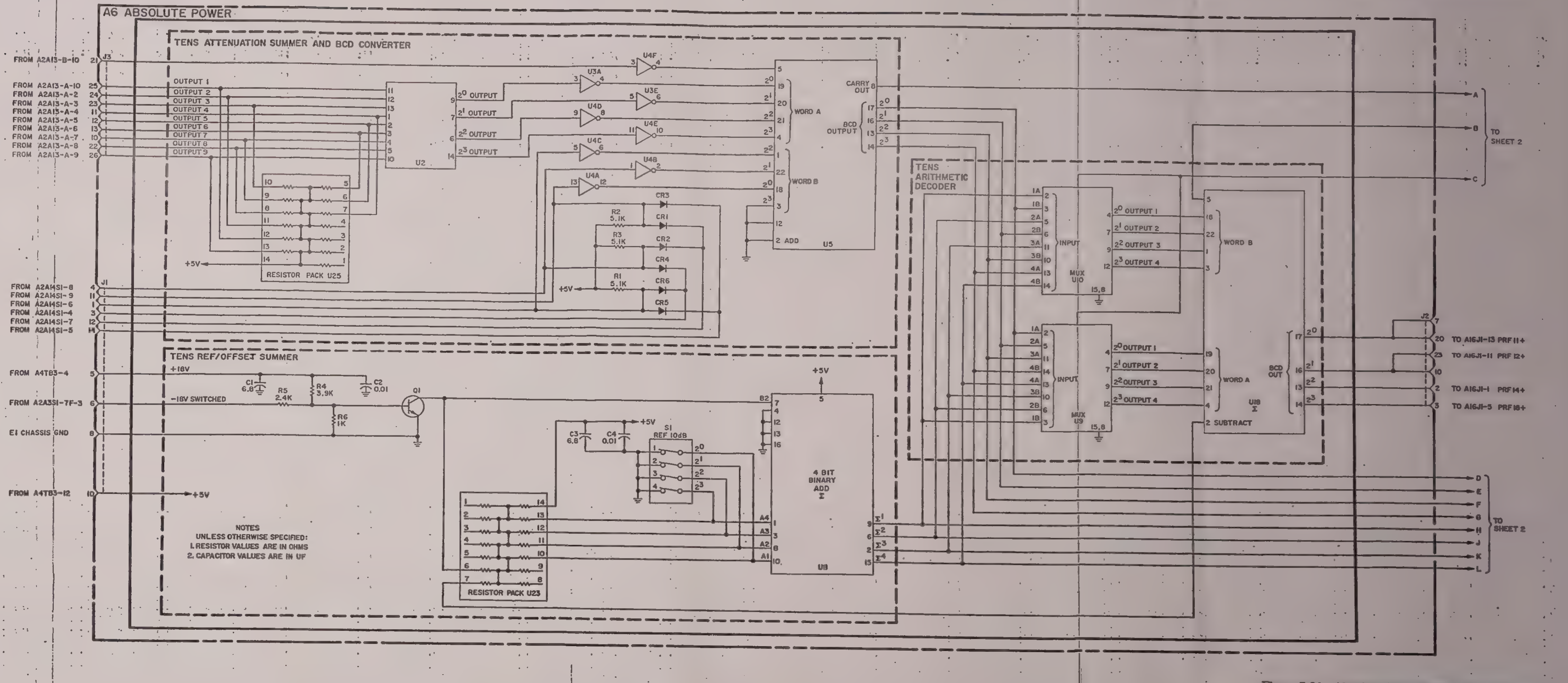
Figure 7-20A. Low Voltage Power Supply 1A4, Maintenance Schematic Diagram (Sheet 2 of 2)

PARTS LOCATION INDEX, ABSOLUTE POWER 1A6

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	11D	S1	12A
C2	12D		
C3	11B	U1	6C
C4	12C	U2	2F
		U3	6F
CR1	4K	U4	2H
CR2	5K	U5	3K
CR3	4K	U6	4C
CR4	5K	U7	4F
CR5	2J	U8	12F
CR6	2J	U9	9H
		U10	12K
J1	7L	U11	11F
J2	9B	U12	4H
J3	6B	U13	7H
J4	2A	U14	6H
		U15	8F
R1	2K	U16	6K
R2	3H	U17	7J
R3	3H	U18	11H
R4	12E	U19	NOT USED
R5	12D	U20	NOT USED
R6	12D	U21	11K
R7	4A	U22	9K
R8	3A	U23	13C
R9	3A	U24	7C
R10	3A	U25	2C



13 12 11 10 9 8 7 6 5 4 3 2 1
M L K J I H G F E D C B A
J1
U10 U21 U22 U17 U16 U5
CR3 CR4 CR1 CR2 CR6 CR5 R1
U18 U9 U13 U14 U12 U4
R3 R2
U8 U11 U15 U3 U7 U2
R4 R5 R6 Q1
U23 C2 C1 C3 C4
U24 U1 U6 U25
J2 J3
S1
R7 R8 R9 R10 J4



A6 ABSOLUTE POWER
TENS ATTENUATION SUMMER AND BCD CONVERTER
FROM A2A13-B-10
FROM A2A13-A-10
FROM A2A13-A-2
FROM A2A13-A-3
FROM A2A13-A-4
FROM A2A13-A-5
FROM A2A13-A-6
FROM A2A13-A-7
FROM A2A13-A-8
FROM A2A13-A-9
J3
OUTPUT 1
OUTPUT 2
OUTPUT 3
OUTPUT 4
OUTPUT 5
OUTPUT 6
OUTPUT 7
OUTPUT 8
OUTPUT 9
U2
2^0 OUTPUT
2^1 OUTPUT
2^2 OUTPUT
2^3 OUTPUT
U3A
U3E
U4D
U4E
U4C
U4B
U4A
U4F
RESISTOR PACK U25
+5V
R2 5.1K
R3 5.1K
R1 5.1K
CR1
CR2
CR3
CR4
CR5
CR6
WORD A
WORD B
CARRY OUT
BCD OUTPUT
2 ADD
U5
FROM A2A14S1-8
FROM A2A14S1-9
FROM A2A14S1-6
FROM A2A14S1-4
FROM A2A14S1-7
FROM A2A14S1-5
J1
TENS REF/OFFSET SUMMER
FROM A4TB3-4
+18V
FROM A2A3S1-7F-3
-18V SWITCHED
E1 CHASSIS GND
FROM A4TB3-12
C1 6.8
R5 2.4K
R4 3.9K
C2 0.01
R6 1K
Q1
C3 6.8
C4 0.01
S1 REF 10dB
RESISTOR PACK U23
4 BIT BINARY ADD Σ
U8
NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
TENS ARITHMETIC DECODER
INPUT
MUX U10
MUX U9
2^0 OUTPUT 1
2^1 OUTPUT 2
2^2 OUTPUT 3
2^3 OUTPUT 4
U18 Σ
BCD OUT
2 SUBTRACT
J2
TO A16J1-13 PRF 11+
TO A16J1-11 PRF 12+
TO A16J1-1 PRF 14+
TO A16J1-5 PRF 18+
TO SHEET 2
A B C D E F G H J K L

Figure 7-21. Absolute Power Printed Circuit Board 1A6, Maintenance Schematic Diagram (Sheet 1 of 2)

7-61/62 blank

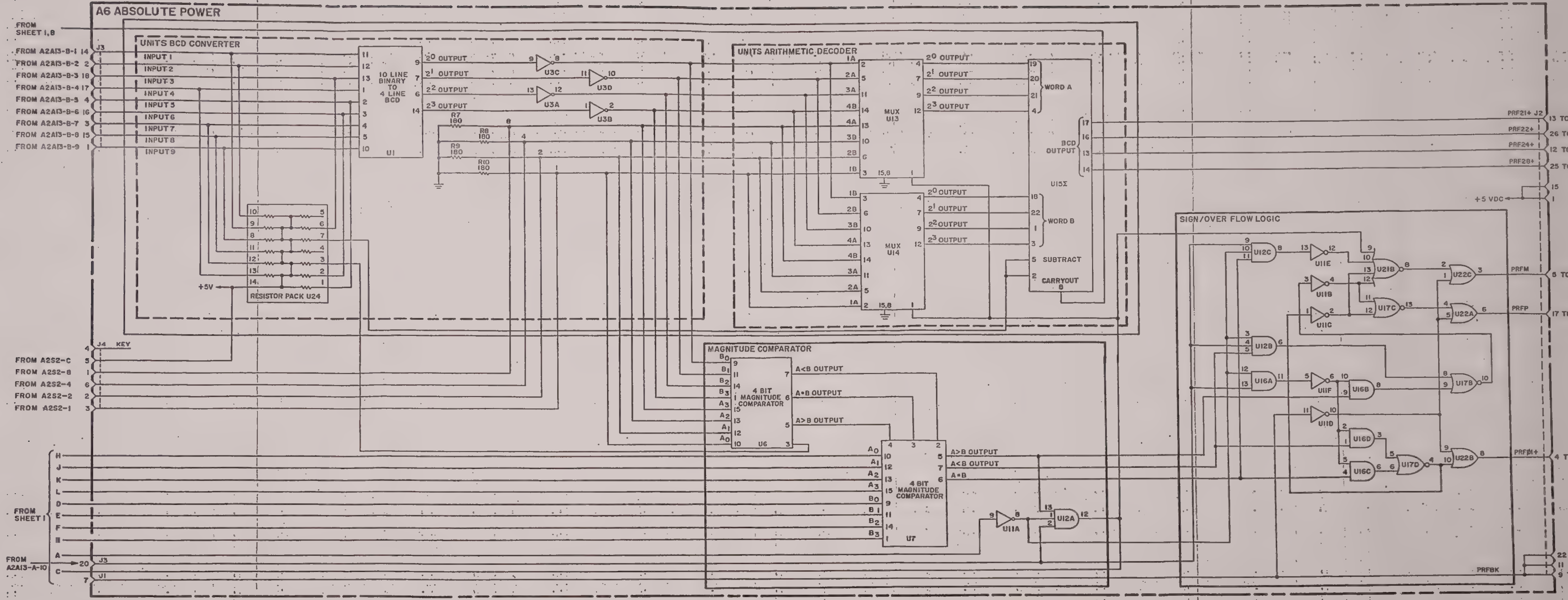
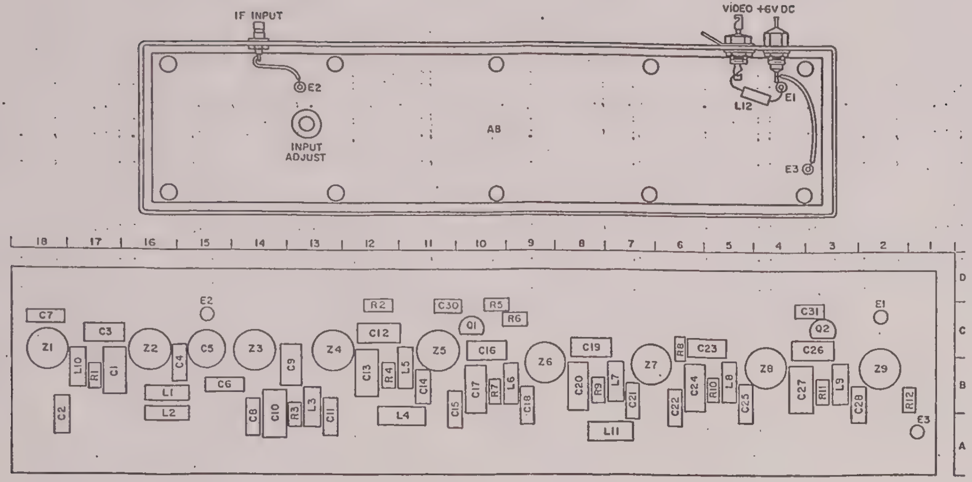

A6 ABSOLUTE POWER
FROM SHEET 1,8
FROM A2A13-B-1 14
FROM A2A13-B-2 2
FROM A2A13-B-3 18
FROM A2A13-B-4 17
FROM A2A13-B-5 4
FROM A2A13-B-6 16
FROM A2A13-B-7 3
FROM A2A13-B-8 15
FROM A2A13-B-9 1
J3
UNITS BCD CONVERTER
INPUT 1
INPUT 2
INPUT 3
INPUT 4
INPUT 5
INPUT 6
INPUT 7
INPUT 8
INPUT 9
10 LINE BINARY TO 4 LINE BCD
U1
2⁰ OUTPUT
2¹ OUTPUT
2² OUTPUT
2³ OUTPUT
U3C
U3D
U3A
U3B
R7 180
R8 180
R9 180
R10 180
RESISTOR PACK U24
+5V
UNITS ARITHMETIC DECODER
MUX U13
MUX U14
WORD A
WORD B
BCD OUTPUT
U15Σ
SUBTRACT
CARRYOUT
PRF21+ J2
PRF22+
PRF24+
PRF28+
13 TO A16J1-2
26 TO A16J1-10
12 TO A16J1-6
25 TO A16J1-4
+5 VDC
SIGN/OVER FLOW LOGIC
U12C
U11E
U21B
U22C
U11B
U11C
U17C
U22A
U12B
U16A
U11F
U16B
U17B
U11D
U16D
U16C
U17D
U22B
PRFM
PRFP
PRFØ1+
5 TO A16J1-3
17 TO A16J1-7
4 TO A16J1-12
J4 KEY
FROM A2S2-C
FROM A2S2-8
FROM A2S2-4
FROM A2S2-2
FROM A2S2-1
MAGNITUDE COMPARATOR
4 BIT MAGNITUDE COMPARATOR
U6
A<B OUTPUT
A=B OUTPUT
A>B OUTPUT
U7
A>B OUTPUT
A<B OUTPUT
A=B
U11A
U12A
FROM SHEET 1
FROM A2A13-A-10
J1
PRFBK
9 TO A16J1-8

Figure 7-21. Absolute Power Printed Circuit Board 1A6, Maintenance Schematic Diagram (Sheet 2 of 2)


IF INPUT
VIDEO
+6V DC
E2
INPUT ADJUST
A8
L12
E1
E3
18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
D
C
B
A
C7
Z1
L10
R1
C1
C3
L1
L2
C2
E2
Z2
C4
C5
Z3
C6
C8
C10
R3
C9
L3
C11
Z4
C13
R4
C12
L5
C14
R2
C30
R5
Q1
R6
Z5
C15
C16
C17
R7
L6
C18
L4
Z6
C20
C19
R9
L7
C21
L11
Z7
C22
R8
C23
C24
R10
L8
C25
Z8
C31
Q2
C26
C27
R11
L9
C28
E1
Z9
R12
E3

PARTS LOCATION INDEX, LOG IF AMPLIFIER 1A8A1

REFERENCE DESIGNATION	ZONE
C1	17B
C2	18B
C3	17C
C4	16C
C5	15C
C6	15B
C7	18C
C8	14A
C9	13B
C10	14A
C11	13A
C12	12C
C13	12B
C14	11B
C15	11B
C16	10C
C17	10B
C18	9B
C19	8C
C20	8B
C21	7A
C22	6B
C23	5C
C24	6B
C25	5B
C26	3C
C27	4B
C28	2B
C29	NOT USED
C30	11C
C31	3C
E1	2C
E2	15C
E3	1A
L1	16B
L2	16A
L3	13B
L4	12A
L5	11B
L6	9B
L7	7B
L8	5B
L9	3B
L10	17B
L11	7A
Q1	10C
Q2	3C
R1	17B
R2	12C
R3	13A
R4	12B
R5	10C
R6	9C
R7	10B
R8	6C
R9	8B
R10	5B
R11	3B
R12	2B
Z1	18C
Z2	16C
Z3	14C
Z4	13C
Z5	11C
Z6	9B
Z7	7B
Z8	4B
Z9	2B

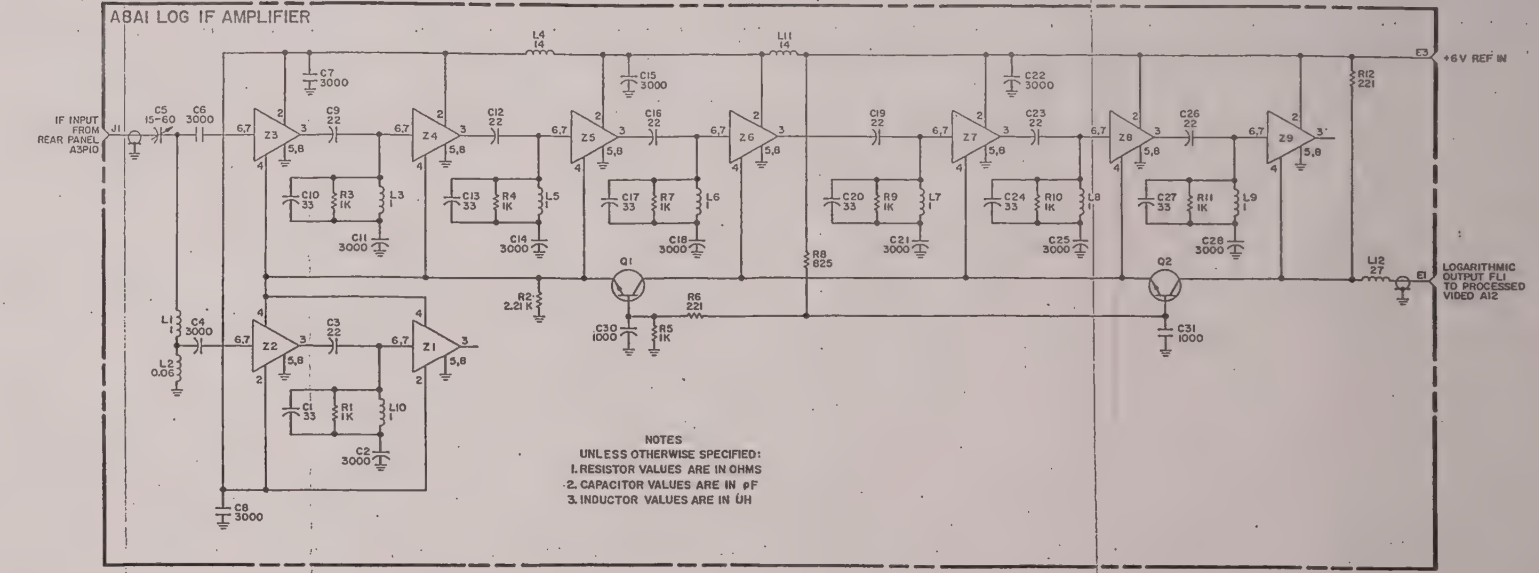

A8A1 LOG IF AMPLIFIER
IF INPUT FROM REAR PANEL A3P10
J1
C5 15-60
C6 3000
C7 3000
L4 14
C15 3000
L11 14
C22 3000
E3
+6V REF IN
R12 221
Z3
Z4
Z5
Z6
Z7
Z8
Z9
C9 22
C12 22
C16 22
C19 22
C23 22
C26 22
C10 33
R3 1K
L3 1
C11 3000
C13 33
R4 1K
L5 1
C14 3000
C17 33
R7 1K
L6 1
C18 3000
C20 33
R9 1K
L7 1
C21 3000
C24 33
R10 1K
L8 1
C25 3000
C27 33
R11 1K
L9 1
C28 3000
Q1
Q2
R2 2.21 K
R6 221
R5 1K
C30 1000
R8 825
C31 1000
L12 27
E1
LOGARITHMIC OUTPUT FL1 TO PROCESSED VIDEO A12
L1 1
L2 0.06
C4 3000
Z2
C3 22
Z1
C1 33
R1 1K
L10 1
C2 3000
C8 3000
NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN ρF
3. INDUCTOR VALUES ARE IN ÚH

Figure 7-22. Log IF Amplifier Assembly 1A8, Maintenance Schematic Diagram

7-65/66 blank

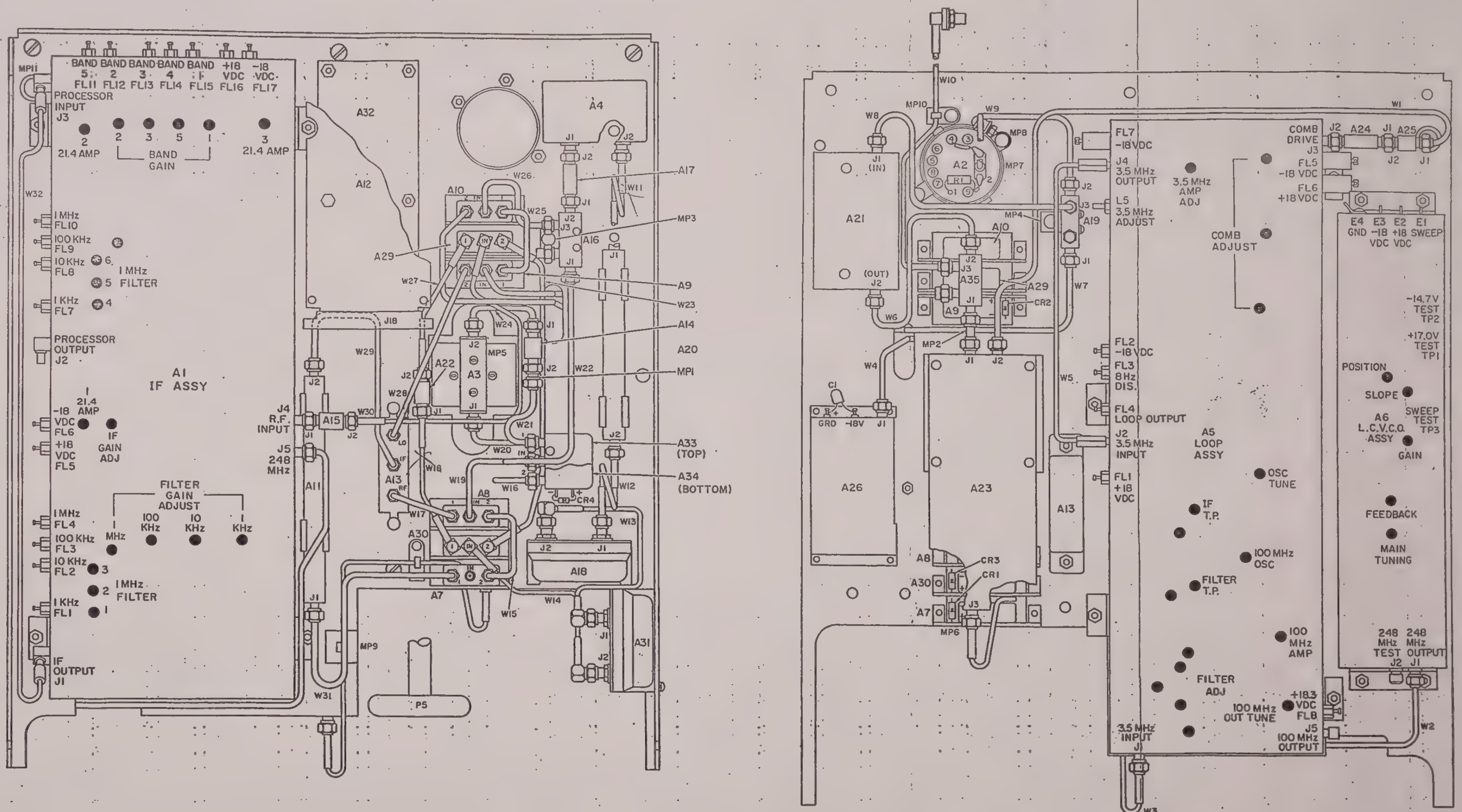
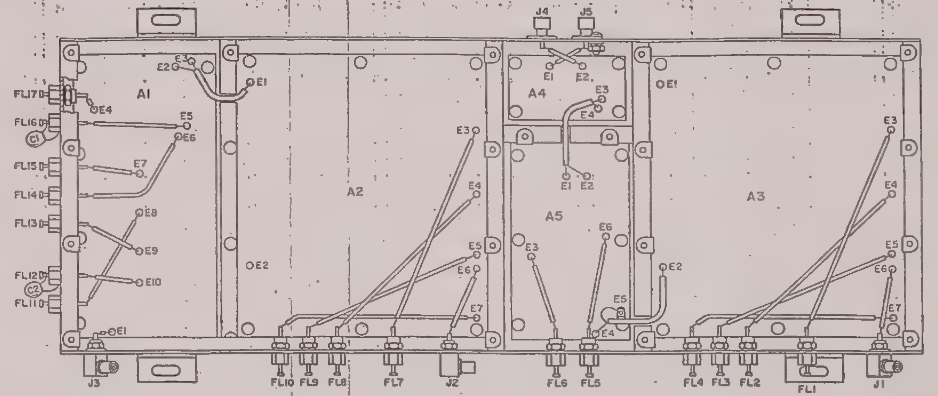

MP11
BAND 5 FL11
BAND 2 FL12
BAND 3 FL13
BAND 4 FL14
BAND 1 FL15
+18 VDC FL16
-18 VDC FL17
PROCESSOR INPUT J3
2 21.4 AMP
2 3 5 1 BAND GAIN
3 21.4 AMP
W32
1 MHz FL10
100 KHz FL9
10 KHz FL8
1 KHz FL7
6 5 4 1 MHz FILTER
PROCESSOR OUTPUT J2
A1 IF ASSY
1 21.4 AMP
-18 VDC FL6
+18 VDC FL5
IF GAIN ADJ
FILTER GAIN ADJUST
1 MHz 100 KHz 10 KHz 1 KHz
1 MHz FL4
100 KHz FL3
10 KHz FL2
1 KHz FL1
3 2 1 1 MHz FILTER
IF OUTPUT J1
A32
A12
A4
J1 J2
W26
A10
W25
A17
MP3
A16
A29
W27
A9
W23
J18
W24
A14
W29
A22
A3
MP5
A20
MP1
W22
J4 R.F. INPUT
A15
W30
J5 248 MHz
A11
W28
W21
W20
A13
W18
W19
W16
A8
A33 (TOP)
A34 (BOTTOM)
W12
CR4
W17
A30
W13
A18
A7
W14
W15
A31
MP9
W31
P5
W10
MP10
W9
W8
MP8
A2
MP7
J1 (IN)
A21
J2 (OUT)
MP4
A19
W7
A35
CR2
W6
MP2
W4
W5
C1
GRD -18V J1
A26
A23
A8
CR3
CR1
A30
A7
J3
MP6
A13
W3
FL7 -18VDC
J4 3.5 MHz OUTPUT
L5 3.5 MHz ADJUST
3.5 MHz AMP ADJ
COMB ADJUST
COMB DRIVE J3
J2 A24 J1 A25
FL5 -18 VDC
FL6 +18 VDC
W1
E4 GND E3 -18 VDC E2 +18 VDC E1 SWEEP
-14.7V TEST TP2
+17.0V TEST TP1
POSITION
SLOPE
SWEEP TEST TP3
A6 L.C.V.C.O. ASSY
GAIN
FEEDBACK
MAIN TUNING
FL2 -18 VDC
FL3 8 Hz DIS.
FL4 LOOP OUTPUT
J2 3.5 MHz INPUT
FL1 +18 VDC
A5 LOOP ASSY
OSC TUNE
IF T.P.
100 MHz OSC
FILTER T.P.
100 MHz AMP
FILTER ADJ
100 MHz OUT TUNE
+18.3 VDC FL8
J5 100 MHz OUTPUT
3.5 MHz INPUT J1
248 MHz TEST J2
248 MHz OUTPUT J1
W2

Figure 7-23. RF/IF Assembly 1A10, Component Location Diagram

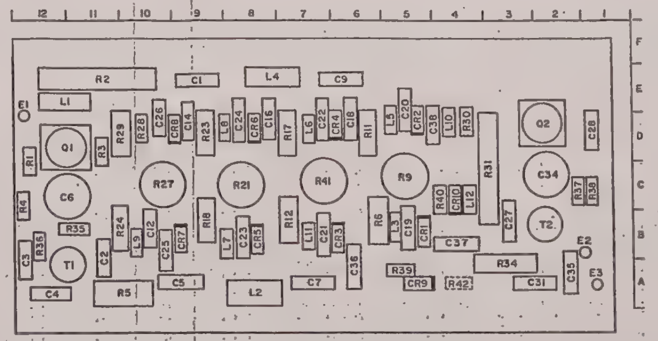
7-67/68 blank

PARTS LOCATION INDEX, IF PROCESSOR 1A10A1A1

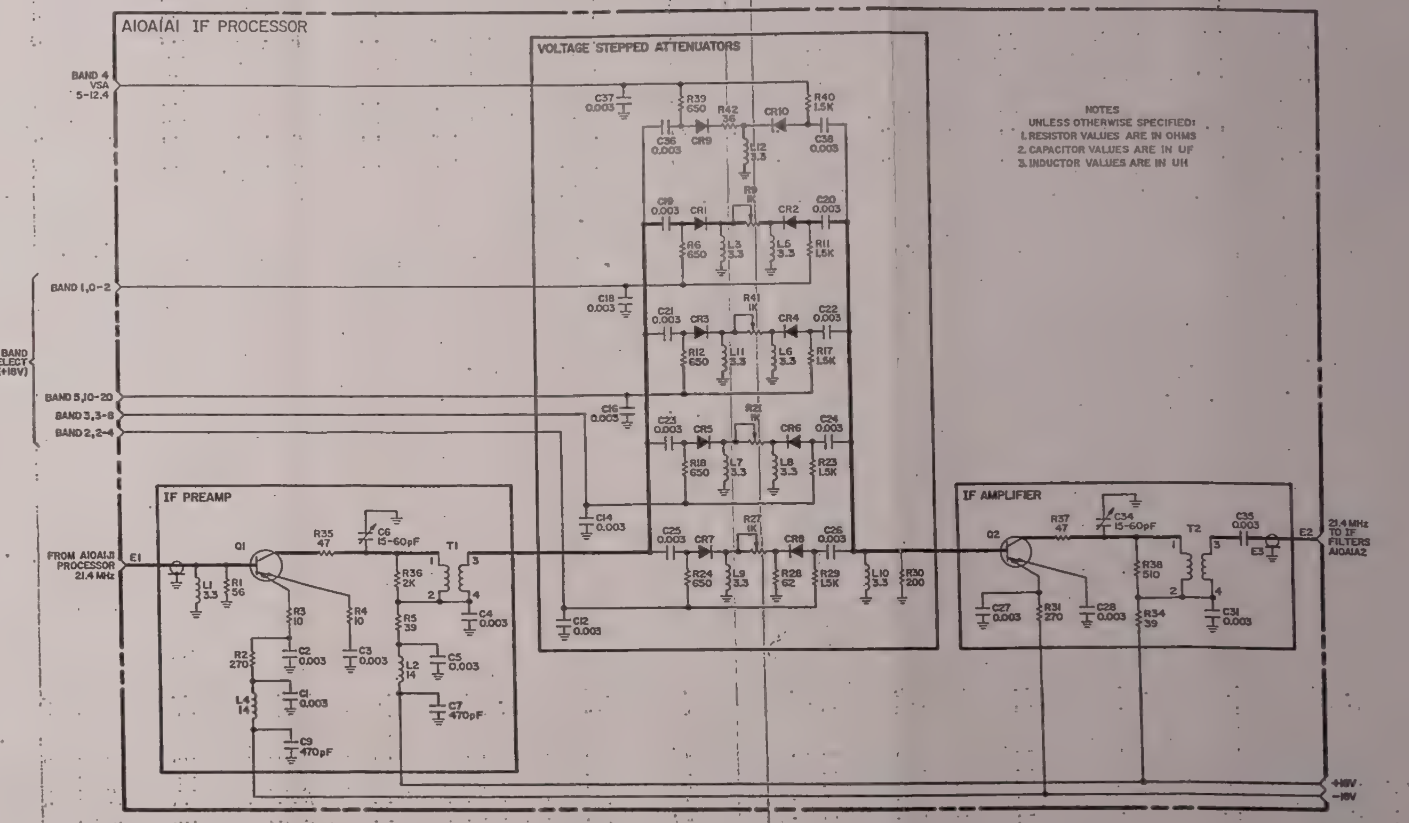
REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	9E	CR10	4C	R27	10C
C2	11B			R28	10D
C3	12B	E1	12E	R29	11D
C4	12A	E2	1B	R30	4D
C5	10A	E3	1A	R31	3C
C6	11C			R32	NOT USED
C7	7A	L1	12E	R33	NOT USED
C8	NOT USED	L2	8A	R34	3A
C9	6E	L3	5C	R35	11B
C10	NOT USED	L4	8E	R36	12B
C11	NOT USED	L5	5D	R37	2C
C12	10B	L6	7D	R38	1C
C13	NOT USED	L7	8C	R39	5A
C14	9D	L8	8D	R40	4C
C15	NOT USED	L9	10B	R41	7C
C16	8E	L10	4D	R42	4A
C17	NOT USED	L11	7C		
C18	6D	L12	4C	T1	11A
C19	5B			T2	2B
C20	5E	Q1	12D		
C21	7B	Q2	2D		
C22	7E				
C23	8B	R1	12D		
C24	8D	R2	11E		
C25	10B	R3	11D		
C26	10E	R4	12C		
C27	3B	R5	10A		
C28	1D	R6	6B		
C29	NOT USED	R7	NOT USED		
C30	NOT USED	R8	NOT USED		
C31	2A	R9	5C		
C32	NOT USED	R10	NOT USED		
C33	NOT USED	R11	6D		
C34	2C	R12	7B		
C35	2A	R13	NOT USED		
C36	6A	R14	NOT USED		
C37	4B	R15	NOT USED		
C38	4D	R16	NOT USED		
		R17	17D		
CR1	5B	R18	9B		
CR2	5D	R19	NOT USED		
CR3	6B	R20	NOT USED		
CR4	6D	R21	8C		
CR5	8B	R22	NOT USED		
CR6	8D	R23	9D		
CR7	10B	R24	11B		
CR8	9D	R25	NOT USED		
CR9	5A	R26	NOT USED		



A1
A2
A3
A4
A5
J1
J2
J3
J4
J5
FL1
FL2
FL3
FL4
FL5
FL6
FL7
FL8
FL9
FL10
FL11
FL12
FL13
FL14
FL15
FL16
FL17
E1
E2
E3
E4
E5
E6
E7
E8
E9
E10



12
11
10
9
8
7
6
5
4
3
2
1
F
E
D
C
B
A
R2
C1
L4
C9
L1
Q1
C6
R27
R21
R41
R9
Q2
C34
T1
T2
R33
R5
C5
L2
C7
R34
C31
R39
C37
E2
E3



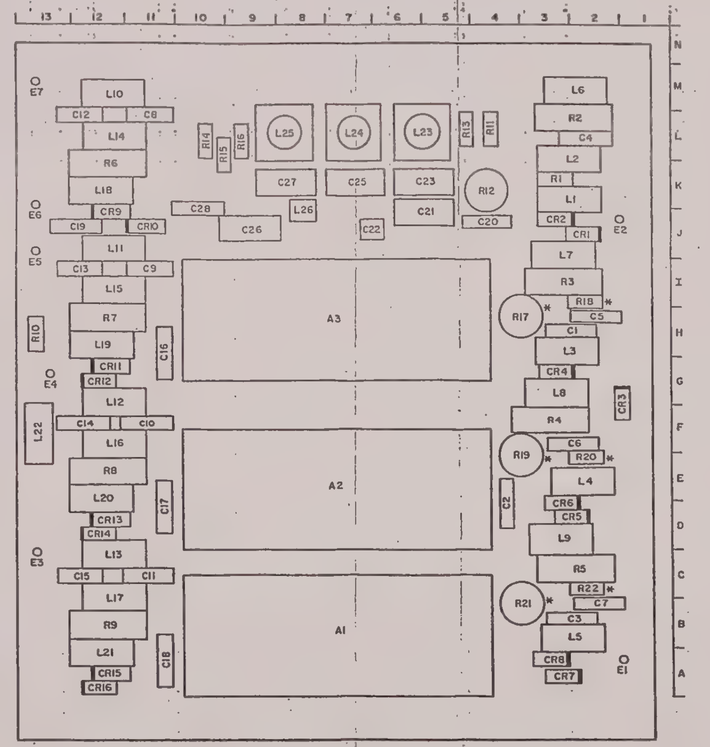
A10A1A1 IF PROCESSOR
VOLTAGE STEPPED ATTENUATORS
IF PREAMP
IF AMPLIFIER
BAND 4 VSA 5-12.4
BAND 1,0-2
BAND SELECT (+18V)
BAND 5,10-20
BAND 3,3-8
BAND 2,2-4
FROM A10A1J1 PROCESSOR 21.4 MHz
E1
E2
E3
21.4 MHz TO IF FILTERS A10A1A2
+18V
-18V
Q1
Q2
T1
T2
NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH

Figure 7-24. IF Processor Assembly 1A10A1, Component Location Diagram and IF Processor Printed Circuit Board 1A10A1A1, Maintenance Schematic Diagram

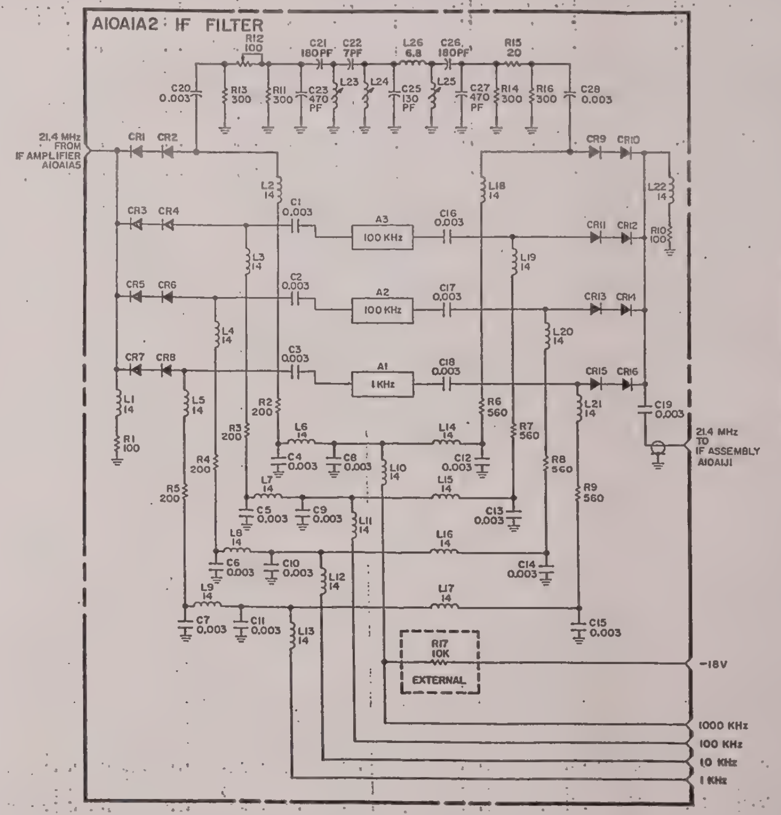
7-69/70 blank

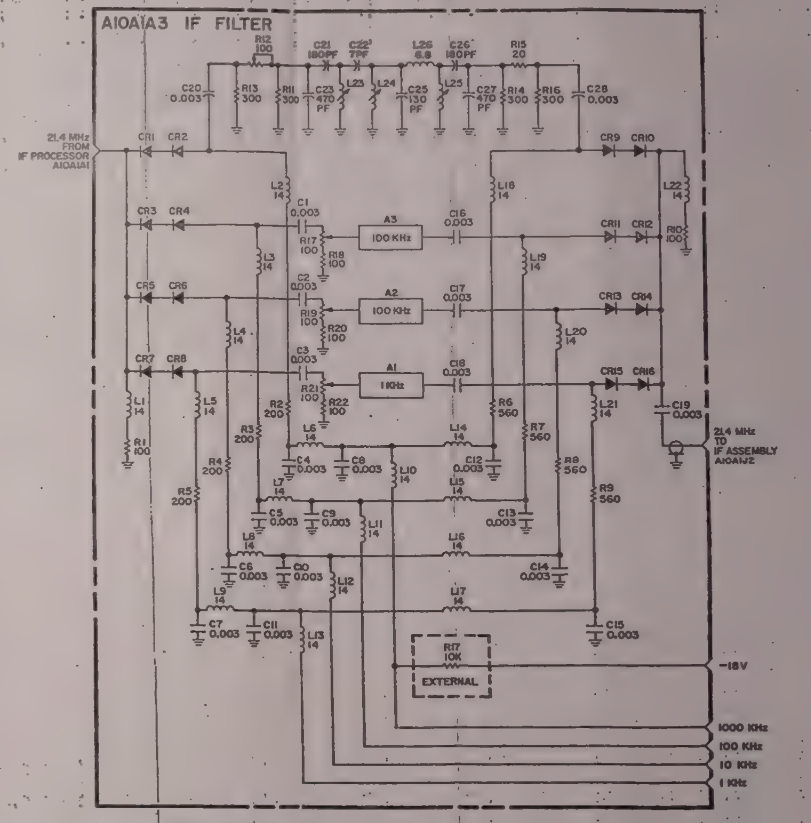
PARTS LOCATION INDEX, IF FILTERS 1A10A1A2 AND 1A10A1A3

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	2H	L1	2K
C2	4E	L2	2L
C3	2B	L3	2H
C4	2L	L4	2E
C5	2H	L5	3B
C6	2F	L6	2M
C7	2B	L7	3J
C8	11L	L8	3G
C9	11I	L9	3D
C10	11F	L10	12M
C11	11C	L11	12J
C12	12L	L12	12G
C13	12I	L13	12C
C14	12F	L14	12L
C15	12C	L15	12I
C16	11H	L16	12F
C17	11E	L17	12C
C18	11A	L18	12K
C19	12J	L19	12H
C20	4J	L20	12E
C21	5J	L21	12A
C22	7J	L22	13F
C23	5K	L23	6L
C24	NOT USED	L24	7L
C25	7K	L25	8L
C26	9J	L26	8J
C27	8K		
C28	10K	R1	2K
		R2	2L
CR1	2J	R3	2I
CR2	3J	R4	3F
CR3	1G	R5	2C
CR4	3G	R6	12K
CR5	2D	R7	12H
CR6	3D	R8	12E
CR7	3A	R9	12B
CR8	3A	R10	13H
CR9	12J	R11	4L
CR10	11J	R12	4K
CR11	12G	R13	5L
CR12	12G	R14	10L
CR13	12D	R15	10L
CR14	12D	R16	9L
CR15	12A	*R17	4H
CR16	12A	*R18	2I
		*R19	4E
		*R20	2E
		*R21	4B
		*R22	2C


13 12 11 10 9 8 7 6 5 4 3 2 1
N M L K J I H G F E D C B A
E1 E2 E3 E4 E5 E6 E7
A1
A2
A3
L25 L24 L23
R12

* USED ON 1A10A1A3

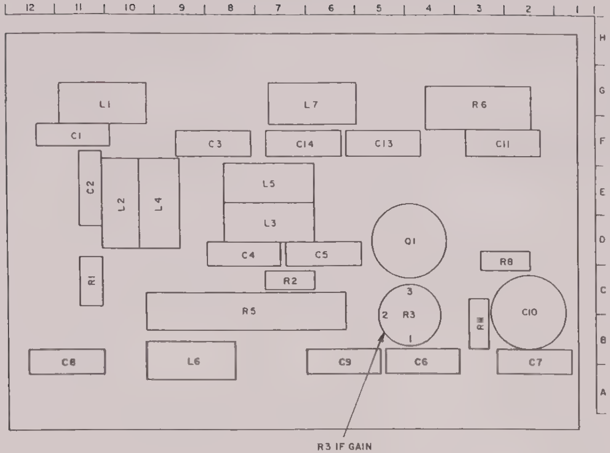

A10A1A2 IF FILTER
21.4 MHz FROM IF AMPLIFIER A10A1A5
21.4 MHz TO IF ASSEMBLY A10A1J1
A3 100 KHz
A2 100 KHz
A1 1 KHz
R17 10K EXTERNAL
-18V
1000 KHz
100 KHz
10 KHz
1 KHz

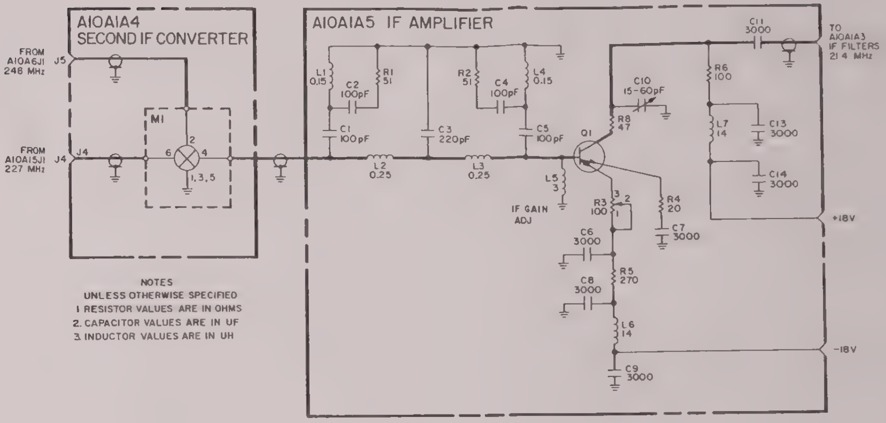

A10A1A3 IF FILTER
21.4 MHz FROM IF PROCESSOR A10A1A1
21.4 MHz TO IF ASSEMBLY A10A1J2
A3 100 KHz
A2 100 KHz
A1 1 KHz
R17 10K EXTERNAL
-18V
1000 KHz
100 KHz
10 KHz
1 KHz

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH

Figure 7-25. IF Filters 1A10A1A2 and 1A10A1A3, Maintenance Schematic Diagram

7-71/72 blank


12
11
10
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
L1
C1
L7
R6
C3
C14
C13
C11
C2
L2
L4
L5
L3
C4
C5
Q1
R8
R1
R2
R5
3
2
R3
1
R7
C10
C8
L6
C9
C6
C7
R3 IF GAIN


A10A1A4
SECOND IF CONVERTER
FROM A10A6J1 248 MHz
J5
FROM A10A15J1 227 MHz
J4
J4
M1
2
6
4
1,3,5
A10A1A5 IF AMPLIFIER
L1 0.15
C2 100pF
R1 51
C1 100pF
C3 220pF
R2 51
C4 100pF
L4 0.15
C5 100pF
L2 0.25
L3 0.25
L5 3
IF GAIN ADJ
Q1
C10 15-60pF
R8 47
R3 100
3
2
1
R4 20
C7 3000
C6 3000
R5 270
C8 3000
L6 14
C9 3000
C11 3000
R6 100
L7 14
C13 3000
C14 3000
TO A10A1A3 IF FILTERS 21.4 MHz
+18V
-18V

NOTES
UNLESS OTHERWISE SPECIFIED
1 RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH

PARTS LOCATION INDEX, IF AMPLIFIER 1A10A1A5

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	11F	C12	NOT USED	Q1	5D
C2	11E	C13	5F		
C3	8F	C14	6F	R1	11C
C4	8D			R2	7C
C5	6D	L1	11G	R3	5B
C6	4B	L2	10E	R4	3B
C7	2B	L3	7D	R5	8C
C8	12B	L4	10E	R6	3G
C9	6B	L5	7E	R7	NOT USED
C10	2C	L6	9B	R8	3D
C11	2F	L7	6G		

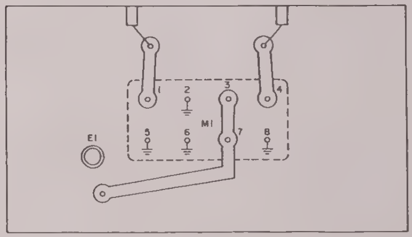

1
2
3
4
5
6
7
8
M1
E1

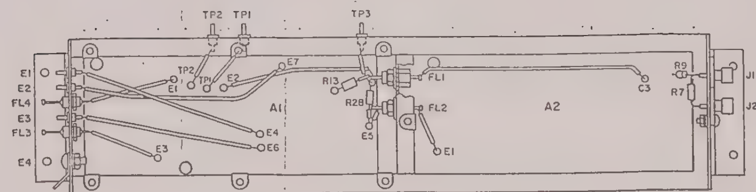
Figure 7-26. Second IF Converter 1A10A1A4 and IF Amplifier 1A10A1A5, Maintenance Schematic Diagram

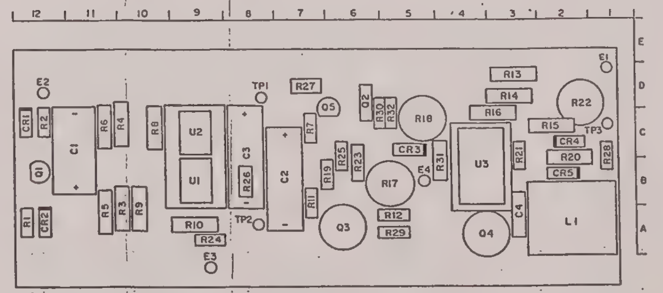
PARTS LOCATION INDEX, LCVCO SHAPER 1A10A6A1

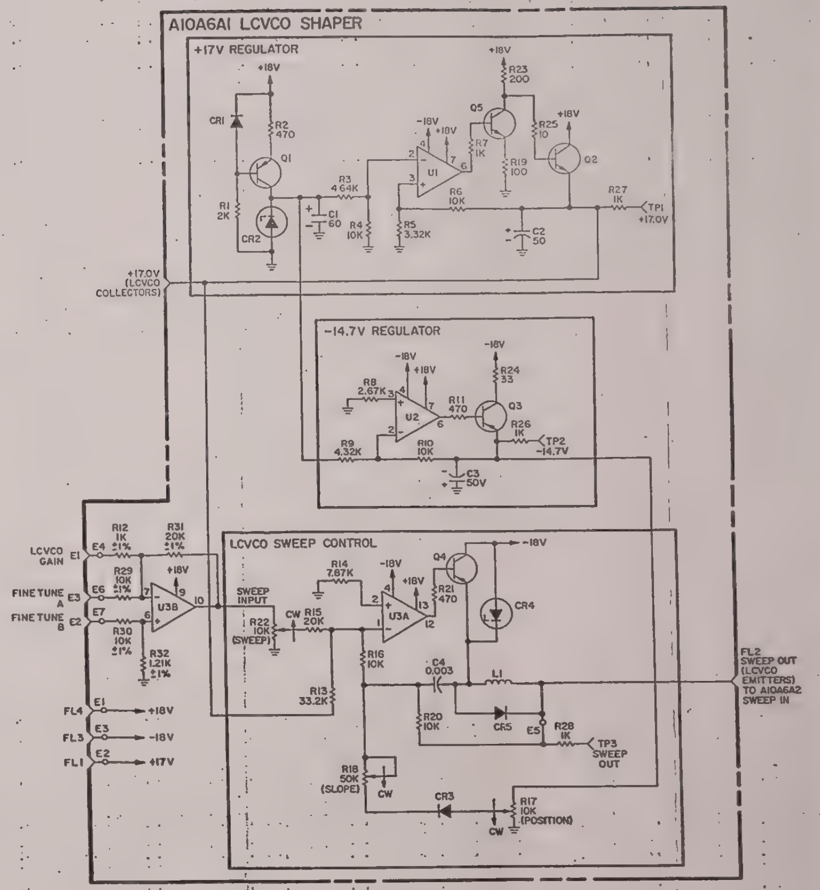
REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	11C	R9	10B
C2	7B	R10	9A
C3	8C	R11	7B
C4	3A	R12	5A
		R13	2D
CR1	12C	R14	3D
CR2	12A	R15	2C
CR3	5C	R16	4C
CR4	2C	R17	5B
CR5	2B	R18	5C
		R19	7B
E1	1E	R20	2C
E2	12D	R21	3C
E3	9A	R22	2D
E4	5B	R23	6C
		R24	9A
L1	2A	R25	6C
		R26	8B
Q1	12B	R27	7D
Q2	6D	R28	1C
Q3	6A	R29	5A
Q4	4A	R30	5D
Q5	6D	R31	4C
		R32	5D
R1	12A		
R2	12C	TP1	8D
R3	10B	TP2	8A
R4	10C	TP3	1C
R5	11A		
R6	11C	U1	9B
R7	7C	U2	9C
R8	10C	U3	4C

PARTS LOCATION INDEX, LCVCO OSCILLATOR 1A10A6A2

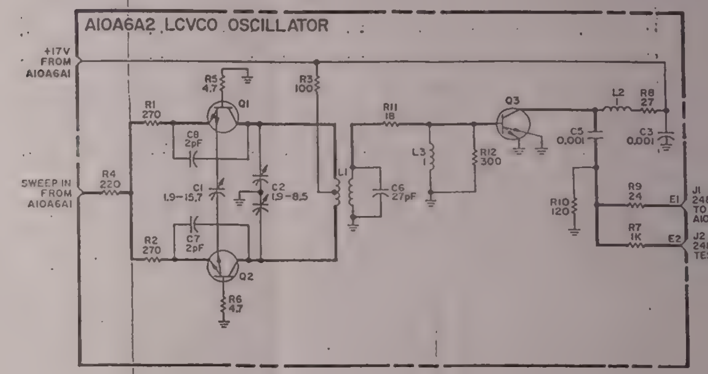
REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	17C	Q3	5C
C2	14C		
C3	7E	R1	18A
C4	NOT USED	R2	18E
C5	5E	R3	7D
C6	6B	R4	19B
C7	15E	R5	17A
C8	15A	R6	17D
		R7	2D
L1	NOT USED	R8	5F
L2	4E	R9	3E
L3	3B	R10	3D
		R11	6A
Q1	16B	R12	2B
Q2	16E		


TP2
TP1
TP3
E1
E2
FL4
E3
FL3
E4
A1
A2
FL1
FL2
E5
E6
R9
R7
C3
J1
J2


12
11
10
9
8
7
6
5
4
3
2
1
E
D
C
B
A
C1
U2
U1
C3
C2
R28
TP1
R27
Q5
R18
R13
R14
R16
R15
CR4
R20
CR5
R22
TP3
R17
Q3
R12
R29
U3
Q4
L1
R10
R24
E3
TP2
E1
E2


A10A6A1 LCVCO SHAPER
+17V REGULATOR
+18V
CR1
R2 470
Q1
R1 2K
CR2
C1 60
R3 4.64K
R4 10K
R5 3.32K
-18V
+18V
U1
R7 1K
Q5
R23 200
R19 100
R25 10
Q2
R6 10K
C2 50
R27 1K
TP1 +17.0V
+17.0V (LCVCO COLLECTORS)
-14.7V REGULATOR
R8 2.67K
U2
R11 470
Q3
R24 33
R26 1K
TP2 -14.7V
R9 4.32K
R10 10K
C3 50V
LCVCO GAIN E1
FINE TUNE A E3
FINE TUNE B E2
E4
E6
E7
R12 1K ±1%
R31 20K ±1%
R29 10K ±1%
R30 10K ±1%
R32 1.21K ±1%
U3B
LCVCO SWEEP CONTROL
SWEEP INPUT
R22 10K (SWEEP)
CW
R15 20K
R14 7.87K
U3A
R21 470
Q4
CR4
R16 10K
R13 33.2K
C4 0.003
L1
R20 10K
CR5
E5
R28 1K
TP3 SWEEP OUT
R18 50K (SLOPE)
CR3
R17 10K (POSITION)
FL4 E1 +18V
FL3 E3 -18V
FL1 E2 +17V
FL2 SWEEP OUT (LCVCO EMITTERS) TO A10A6A2 SWEEP IN

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH


A10A6A2 LCVCO OSCILLATOR
+17V FROM A10A6A1
SWEEP IN FROM A10A6A1
R4 220
R1 270
R2 270
R5 4.7
R6 4.7
Q1
Q2
C8 2pF
C7 2pF
C1 1.9-15.7
C2 1.9-8.5
R3 100
L1
C6 27pF
R11 18
L3 1
R12 300
Q3
C5 0.001
L2
R8 27
C3 0.001
R10 120
R9 24
R7 1K
E1
E2
J1 248 MHz TO A10A1A4J5
J2 248 MHz TEST

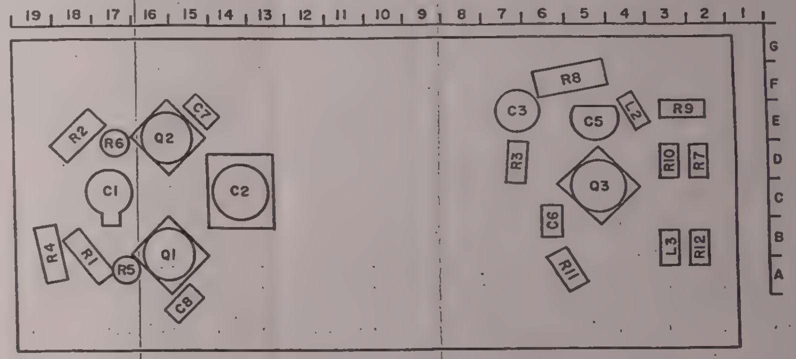
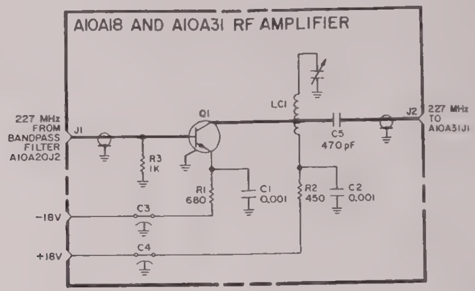

19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
G
F
E
D
C
B
A
R2
R6
Q2
C7
C1
C2
R4
R1
R5
Q1
C8
R8
C3
C5
R9
R3
Q3
R10
R7
C6
R11
L3
R12

Figure 7-27. Local Oscillator 1A10A6, Component Location Diagram; LCVCO Shaper Printed Circuit Board 1A10A6A1 and LCVCO Oscillator Printed Circuit Board 1A10A6A2, Maintenance Schematic Diagrams

PARTS LOCATION INDEX, RF AMPLIFIER 1A10A18 AND 1A10A31

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	5E	Q1	4F
C2	3C		
C3	3F	R1	3E
C4	3A	R2	3B
C5	4B	R3	5G
J1	5F	T1	3D
J2	5A		
LC1	5C		

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH


A10A18 AND A10A31 RF AMPLIFIER
227 MHz FROM BANDPASS FILTER A10A20J2
J1
R3 1K
Q1
R1 680
C1 0.001
C3
-18V
C4
+18V
LC1
C5 470 pF
R2 450
C2 0.001
J2
227 MHz TO A10A31J1

	J1	J2
A10A18	FROM A10A20J2	TO A10A31J1
A10A31	FROM A10A18J2	TO A10A30J2

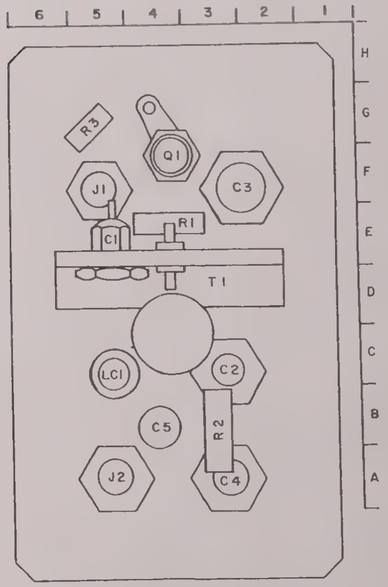
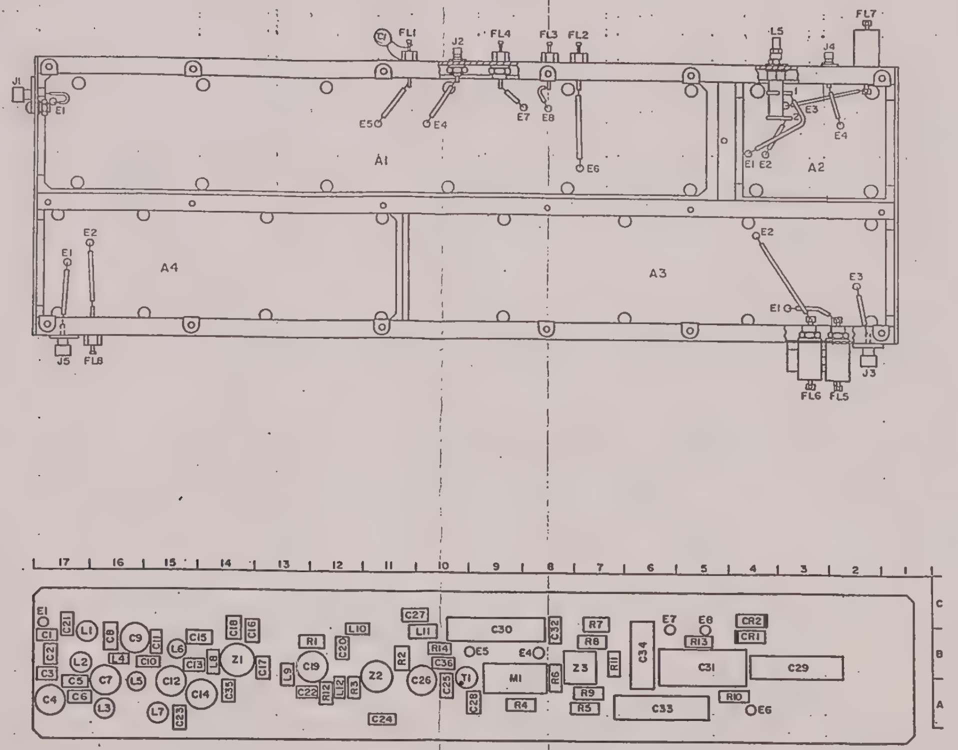
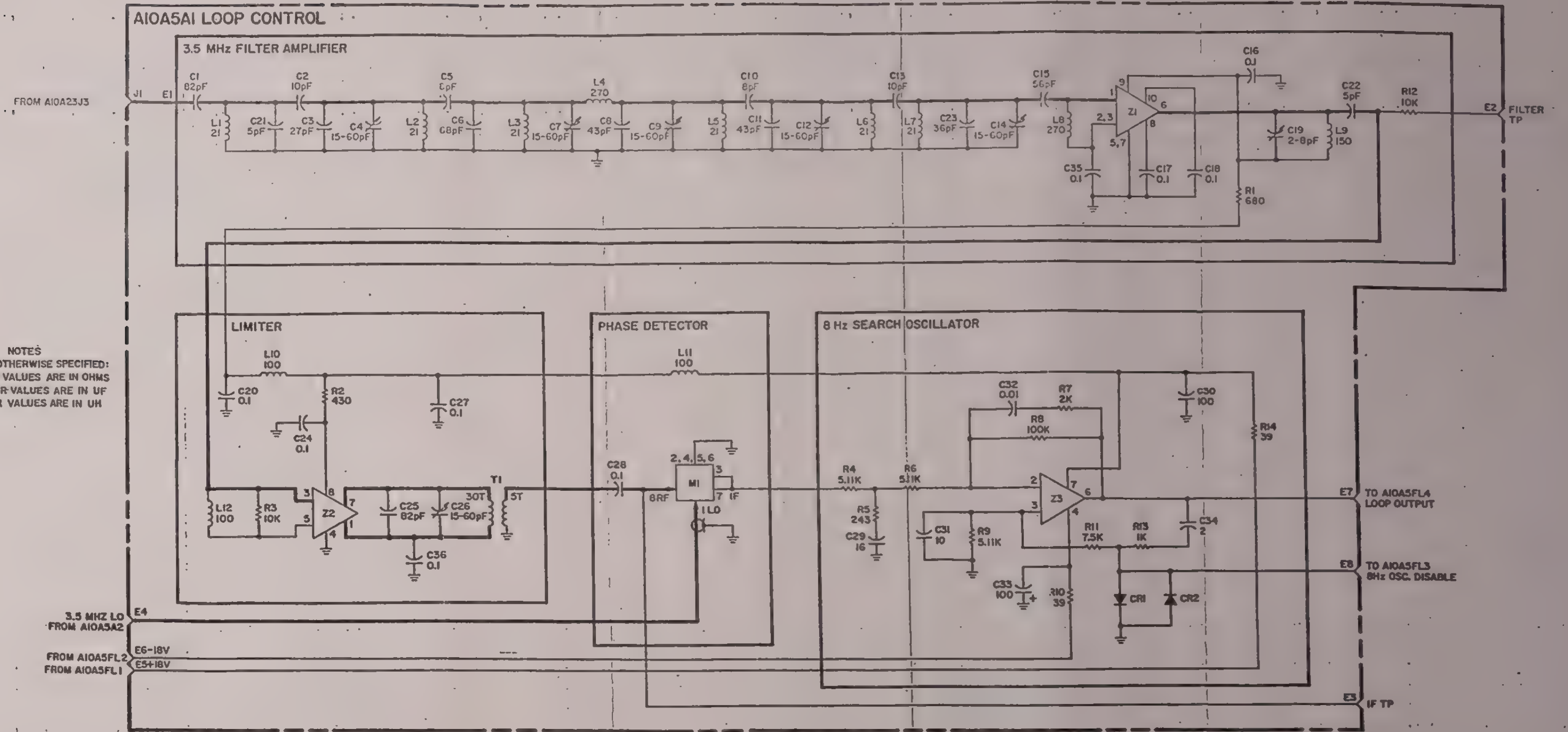

6
5
4
3
2
1
H
G
F
E
D
C
B
A
R3
Q1
J1
C3
R1
C1
T1
LC1
C2
C5
R2
J2
C4

Figure 7-28. RF Amplifiers 1A10A18 and 1A10A31, Maintenance Schematic Diagram

PARTS LOCATION INDEX, LOOP CONTROL 1A10A5A1

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	17B	C28	9A	L6	15B
C2	17B	C29	3B	L7	15A
C3	17B	C30	9B	L8	14B
C4	17A	C31	5B	L9	13A
C5	17B	C32	8B	L10	12B
C6	17A	C33	6A	L11	10B
C7	16A	C34	6B	L12	12A
C8	16B	C35	14A		
C9	16B	C36	10B	M1	9A
C10	15B				
C11	15B	CR1	4B	R1	12B
C12	15A	CR2	4C	R2	11B
C13	14B			R3	12A
C14	14A	E1	17C	R4	8A
C15	14B	E2	NOT USED	R5	7A
C16	13B	E3	NOT USED	R6	8A
C17	13B	E4	8B	R7	7C
C18	14C	E5	9B	R8	7B
C19	12B	E6	4A	R9	7A
C20	12B	E7	6C	R10	5A
C21	17C	E8	5C	R11	7B
C22	12A			R12	12A
C23	15A	L1	17B	R13	5B
C24	11A	L2	17B	R14	10B
C25	10A	L3	16A		
C26	10B	L4	16B	T1	9A
C27	10A	L5	16A		
				Z1	14B
				Z2	11B
				Z3	7B


FL1
J2
FL4
FL3
FL2
L5
FL7
J1
E1
E5
E4
E7
E8
E6
A1
E1
E2
E3
E4
A2
E2
E1
A4
A3
E2
E3
E1
J5
FL8
J4
J3
FL6
FL5
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
C
B
A
M1
Z1
Z2
Z3
T1
C30
C31
C29
C33
C34


A1OA5A1 LOOP CONTROL
3.5 MHz FILTER AMPLIFIER
FROM A1OA23J3
J1
E1
C1 82pF
C2 10pF
C5 8pF
L4 270
C10 8pF
C13 10pF
C15 56pF
C16 0.1
C22 5pF
R12 10K
E2
FILTER TP
L1 21
C21 5pF
C3 27pF
C4 15-60pF
L2 21
C6 68pF
L3 21
C7 15-60pF
C8 43pF
C9 15-60pF
L5 21
C11 43pF
C12 15-60pF
L6 21
L7 21
C23 36pF
C14 15-60pF
L8 270
Z1
C35 0.1
C17 0.1
C18 0.1
C19 2-8pF
L9 150
R1 680
LIMITER
L10 100
C20 0.1
R2 430
C24 0.1
C27 0.1
L12 100
R3 10K
Z2
C25 82pF
C26 15-60pF
30T
5T
T1
C36 0.1
PHASE DETECTOR
L11 100
C28 0.1
8RF
M1
1 LO
7 IF
2, 4, 5, 6
8 Hz SEARCH OSCILLATOR
C32 0.01
R7 2K
R8 100K
C30 100
R14 39
R4 5.11K
R6 5.11K
R5 243
C29 16
C31 10
R9 5.11K
Z3
R11 7.5K
R13 1K
C34 2
C33 100
R10 39
CR1
CR2
E7
TO A1OA5FL4 LOOP OUTPUT
E8
TO A1OA5FL3 8Hz OSC. DISABLE
E3
IF TP
E4
3.5 MHZ LO FROM A1OA5A2
E6-18V
FROM A1OA5FL2
E5+18V
FROM A1OA5FL1

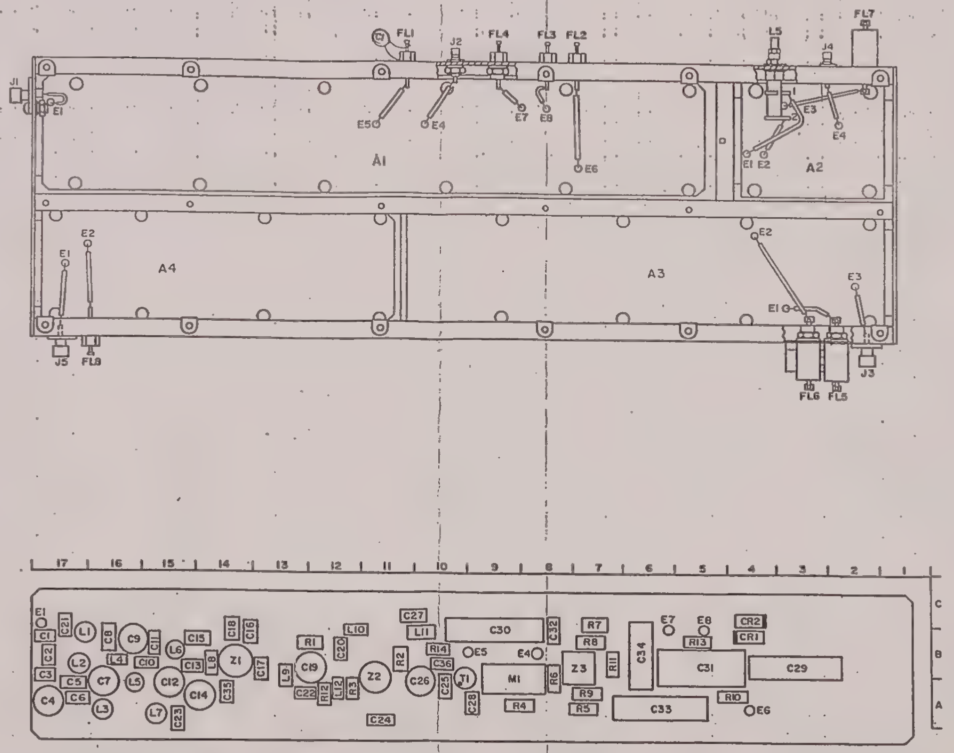
NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH

Figure 7-30. Loop Control Assembly 1A10A5, Component Location Diagram and Loop Control Printed Circuit Board 1A10A5A1, Maintenance Schematic Diagram

7-81/82 blank

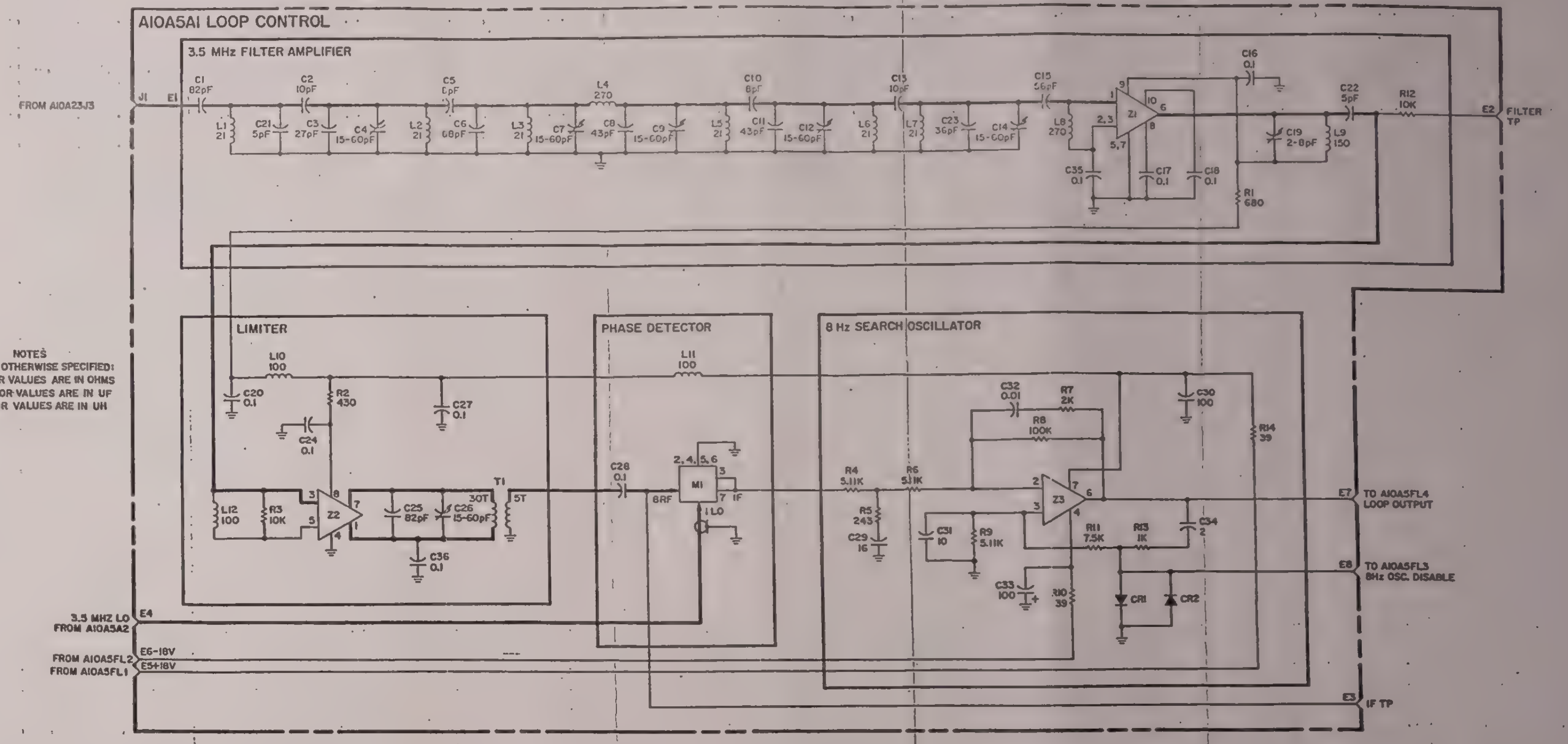
PARTS LOCATION INDEX, LOOP CONTROL 1A10A5A1

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	17B	C28	9A	L6	15B
C2	17B	C29	3B	L7	15A
C3	17B	C30	9B	L8	14B
C4	17A	C31	5B	L9	13A
C5	17B	C32	8B	L10	12B
C6	17A	C33	6A	L11	10B
C7	16A	C34	6B	L12	12A
C8	16B	C35	14A		
C9	16B	C36	10B	M1	9A
C10	15B				
C11	15B	CR1	4B	R1	12B
C12	15A	CR2	4C	R2	11B
C13	14B			R3	12A
C14	14A	E1	17C	R4	8A
C15	14B	E2	NOT USED	R5	7A
C16	13B	E3	NOT USED	R6	8A
C17	13B	E4	8B	R7	7C
C18	14C	E5	9B	R8	7B
C19	12B	E6	4A	R9	7A
C20	12B	E7	6C	R10	5A
C21	17C	E8	5C	R11	7B
C22	12A			R12	12A
C23	15A	L1	17B	R13	5B
C24	11A	L2	17B	R14	10B
C25	10A	L3	16A		
C26	10B	L4	16B	T1	9A
C27	10A	L5	16A		
				Z1	14B
				Z2	11B
				Z3	7B



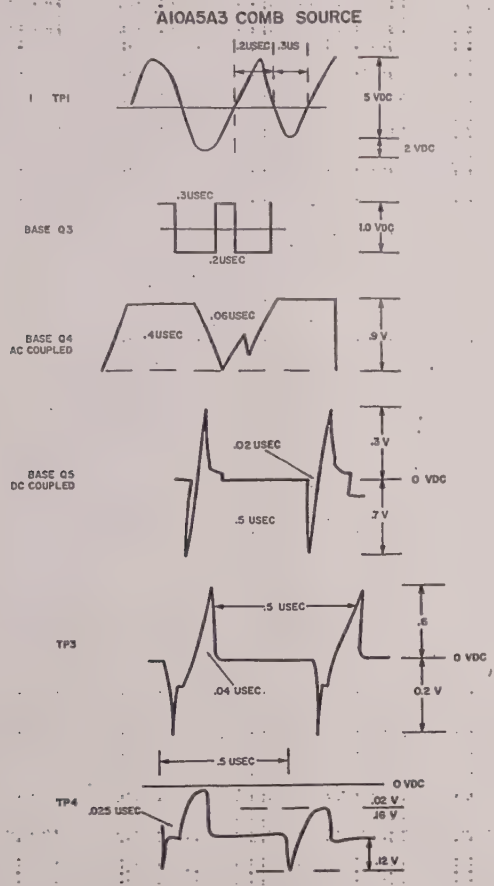
FL1
J2
FL4
FL3
FL2
L5
FL7
J4
J1
E1
E5
E4
E7
E8
E6
E3
A1
A2
E1 E2
E2
E1
A4
A3
E2
E3
E1
J5
FL8
FL6
FL5
J3
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
C
B
A
C27
C30
C32
R7
E7
E8
CR2
L10
L11
R8
CR1
R1
C34
R13
R2
R4
C36
C5
E4
Z3
C31
C29
M1
R6
Z2
C26
Z1
R9
C33
R10
E6
R3
R5
C24
C28
C9
Z1
C19
C22
C20
C25
L1
L2
L3
L4
L6
L7
L8
L9
L12
C1
C2
C3
C4
C6
C7
C8
C10
C11
C12
C13
C14
C15
C16
C17
C18
C21
C23
C35
R11
R12
R14

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH



A1OA5A1 LOOP CONTROL
3.5 MHz FILTER AMPLIFIER
FROM A1OA2J3
J1
E1
E2
FILTER TP
LIMITER
PHASE DETECTOR
8 Hz SEARCH OSCILLATOR
E7 TO A1OA5FL4 LOOP OUTPUT
E8 TO A1OA5FL3 8Hz OSC. DISABLE
3.5 MHZ LO FROM A1OA5A2 E4
FROM A1OA5FL2 E6-18V
FROM A1OA5FL1 E5+18V
E3 IF TP
L10 100
R2 430
C20 0.1
C24 0.1
C27 0.1
L12 100
R3 10K
Z2
C25 82pF
C26 15-60pF
C36 0.1
T1
30T
5T
C28 0.1
L11 100
M1
LO
RF
IF
R4 5.11K
R5 5.11K
R6 243
C29 15
C31 10
R9 5.11K
C32 0.01
R7 2K
R8 100K
C30 100
R14 39
Z3
R11 7.5K
R13 1K
C34
C33 100
R10 39
CR1
CR2
C1 82pF
C2 10pF
C5 5pF
L4 270
C10 6pF
C13 10pF
C15 5.6pF
C16 0.1
C22 5pF
R12 10K
Z1
R1 680
L9 150
C19 2-8pF
C35 0.1
C17 0.1
C18 0.1
L8 270

Figure 7-30. Loop Control Assembly 1A10A5, Component Location Diagram and Loop Control Printed Circuit Board 1A10A5A1, Maintenance Schematic Diagram


A10A5A3 COMB SOURCE
TP1
.2USEC
.3US
5 VDC
2 VDC
BASE Q3
.3USEC
.2USEC
1.0 VDC
BASE Q4
AC COUPLED
.06USEC
.4USEC
.9 V
BASE Q5
DC COUPLED
.02 USEC
.5 USEC
.3 V
0 VDC
.7 V
TP3
.5 USEC
.04 USEC
.6
0 VDC
0.2 V
TP4
.5 USEC
0 VDC
.025 USEC
.02 V
.16 V
.12 V

PARTS LOCATION INDEX, 3.5 MHz OSCILLATOR 1A10A5A2

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	NOT USED	L1	7C
C2	8G	L2	2B
C3	7E	L3	2C
C4	10B	L4	2D
C5	7C	L5	2F
C6	5F	Q1	8F
C7	6F	Q2	5D
C8	4C	R1	9E
C9	2B	R2	8D
C10	4F	R3	9D
C11	2E	R4	5C
C12	3B	R5	6C
C13	2F	R6	5F
CR1	10F	R7	5B

PARTS LOCATION INDEX, COMB SOURCE 1A10A5A3

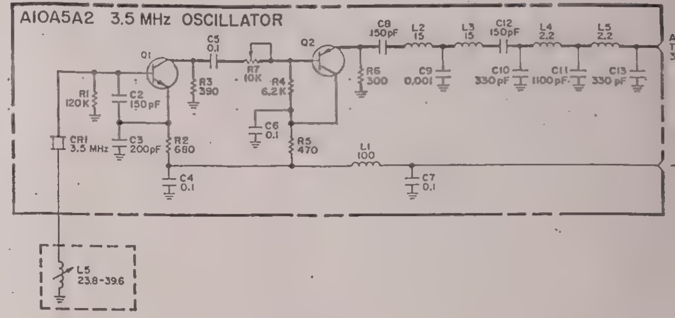
REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	17C	C25	2B	Q4	13C
C2	15B	C26	10C	Q5	11B
C3	15C	C27	17B	Q6	8C
C4	14C			Q7	4B
C5	16C	CR1	16B	R1	17C
C6	14B	CR2	14C	R2	17A
C7	13B	CR3	14A	R3	17A
C8	12C	CR4	11C	R4	15C
C9	12C			R5	16C
C10	11A	L1	13C	R6	16A
C11	11A	L2	13C	R7	15A
C12	11C	L3	13B	R8	15A
C13	9C	L4	9C	R9	15C
C14	9C	L5	10B	R10	14B
C15	7B	L6	10A	R11	12C
C16	9A	L7	6C	R12	11C
C17	7C	L8	7B	R13	12B
C18	5C	L9	7A	R14	10C
C19	5B	L10	3C	R15	8C
C20	4B	L11	12B	R16	8B
C21	6A			R17	6C
C22	4C	Q1	17B	R18	5B
C23	5C	Q2	16C	R19	4A
C24	4C	Q3	15B	R20	4D

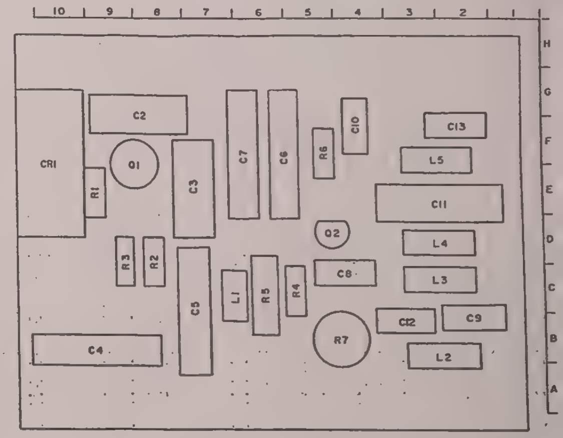
PARTS LOCATION INDEX, 100 MHz OSCILLATOR 1A10A5A4

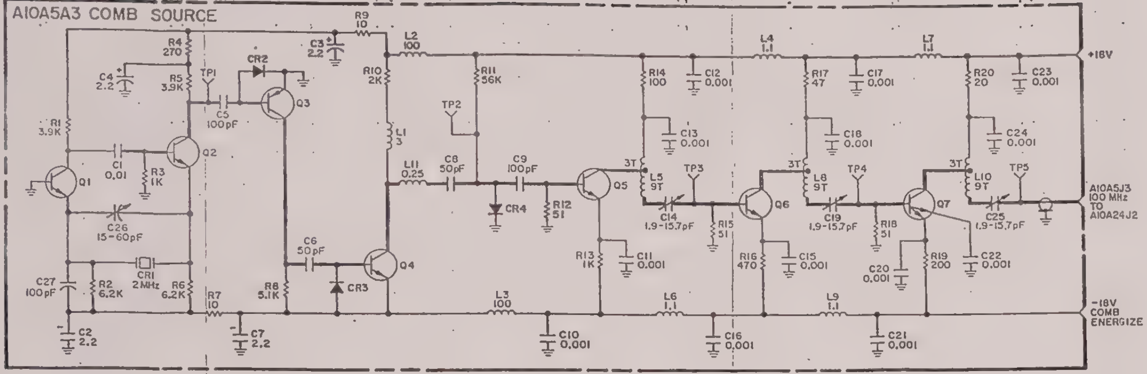
REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	13C	L2	11B
C2	13B	L3	8C
C3	10D	L4	3C
C4	10C	L5	1B
C5	10A		
C6	12A	Q1	9D
C7	NOT USED	Q2	5C
C8	10A	Q3	12B
C9	NOT USED		
C10	9B	R1	10B
C11	5A	R2	8A
C12	6D	R3	7B
C13	3B	R4	4B
C14	2D	R5	6D
C15	5A	R6	9C
C16	4A	R7	13C
		R8	13B
E1	2C	R9	13D
E2	3B	R10	9B
E3	5B	R11	4A
L1	11D	Y1	11C

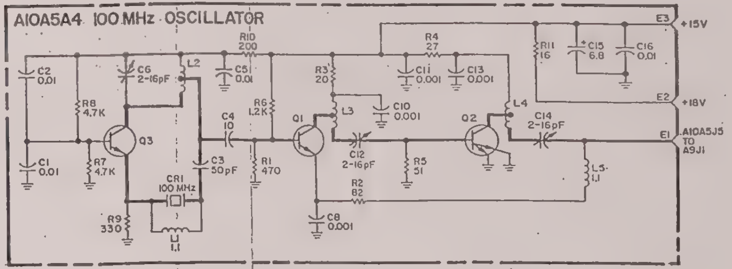
NOTES

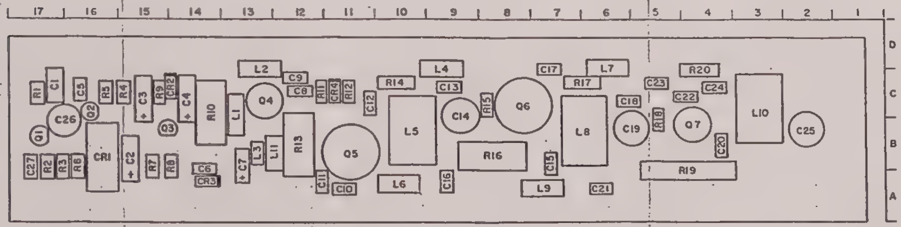
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH


A10A5A2 3.5 MHz OSCILLATOR
Q1
Q2
C5 0.1
R7 10K
R1 120K
C2 150pF
R3 390
R4 6.2K
C6 0.1
CR1 3.5 MHz
C3 200pF
R2 680
R5 470
C4 0.1
L1 100
C7 0.1
R6 300
C8 150pF
L2 15
C9 0.001
L3 15
C12 150pF
C10 330pF
L4 2.2
C11 1100pF
L5 2.2
C13 330pF
L5 23.8-39.6


10
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
CR1
C2
Q1
R1
C3
C7
C6
R6
C10
C13
L5
C11
Q2
L4
L3
R3
R2
C5
L1
R5
R4
C8
C12
C9
R7
C4
L2


A10A5A3 COMB SOURCE
R9 10
L2 100
C3 2.2
R4 270
C4 2.2
R5 3.9K
TP1
CR2
Q3
C5 100pF
R10 2K
R11 56K
TP2
L1 3
R1 3.9K
C1 0.01
R3 1K
Q2
Q1
C26 15-60pF
C27 100pF
R2 6.2K
CR1 2MHz
R6 6.2K
R7 10
R8 5.1K
C6 50pF
CR3
Q4
L11 0.25
C8 50pF
C9 100pF
CR4
R12 51
Q5
R13 1K
C11 0.001
L3 100
C10 0.001
C2 2.2
C7 2.2
R14 100
C12 0.001
C13 0.001
3T
L5 9T
TP3
C14 1.9-15.7pF
R15 51
Q6
R16 470
C15 0.001
L6 1.1
C16 0.001
L4 1.1
R17 47
C17 0.001
C18 0.001
L8 9T
TP4
C19 1.9-15.7pF
R18 51
C20 0.001
L9 1.1
C21 0.001
L7 1.1
R20 20
C23 0.001
C24 0.001
L10 9T
TP5
Q7
C25 1.9-15.7pF
R19 200
C22 0.001
+18V
A10A5J3 100 MHz TO A10A24J2
-18V COMB ENERGIZE


A10A5A4 100 MHz OSCILLATOR
E3 +15V
E2 +18V
E1 A10A5J5 TO A9J1
C2 0.01
C1 0.01
R8 4.7K
R7 4.7K
C6 2-16pF
L2
Q3
CR1 100 MHz
L1 1.1
R9 330
C5 0.01
R10 200
R6 1.2K
C4 10
C3 50pF
R1 470
R3 20
L3
Q1
C10 0.001
C12 2-16pF
C8 0.001
R2 82
R5 51
R4 27
C11 0.001
C13 0.001
Q2
L4
C14 2-16pF
L5 1.1
R11 16
C15 6.8
C16 0.01


17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
D C B A
R1 C1 C5 R5 R4 C3 R9 CR2 C4 R10 L1 L2 C9 C8 R11 CR4 R12 Q4 C12 R14 L4 C13 R15 C14 Q6 C17 L7 R17 C23 C18 C22 R20 C24 L10 C25
C26 Q2 Q1 CR1 C2 Q3 R7 R8 C6 CR3 C7 L3 L11 R13 Q5 C11 C10 L5 L6 C16 R16 C15 L9 L8 C19 R18 Q7 C20 R19 C21
C27 R2 R3 R6

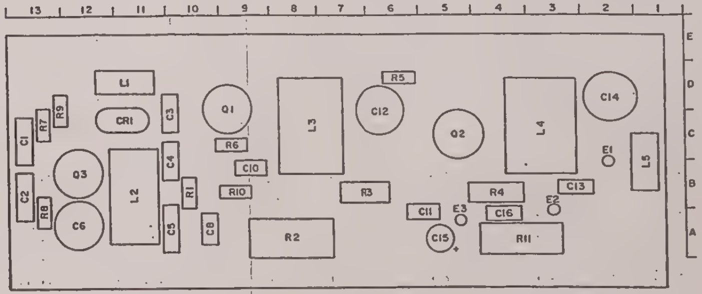
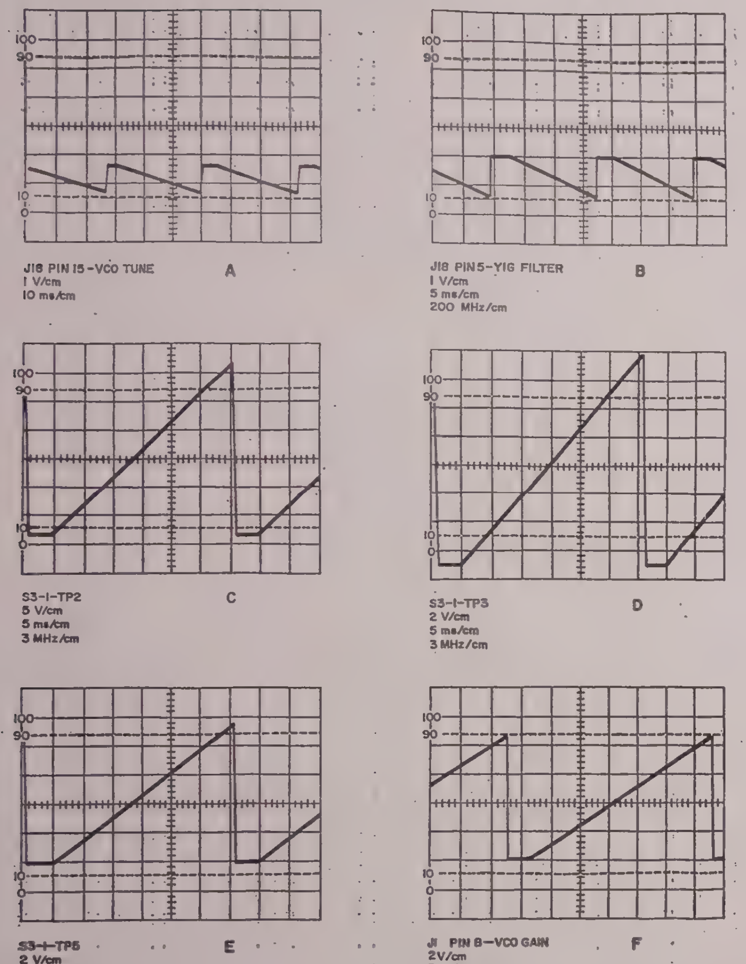

13 12 11 10 9 8 7 6 5 4 3 2 1
E D C B A
L1 C1 R7 R9 CR1 C3 Q1 L3 R5 C12 Q2 L4 C14
R6 C10 E1 L5
C2 R8 Q3 C6 L2 C4 R1 R10 R3 C11 E3 R4 C16 E2 C13
C5 C8 R2 C15 R11

Figure 7-31. 3.5 MHz Oscillator 1A10A5A2, Comb Generator 1A10A5A3, and 100 MHz Oscillator 1A10A5A4, Maintenance Schematic Diagrams

7-83/84 blank



J18 PIN 15 - VCO TUNE
1 V/cm
10 ms/cm
A

J18 PIN 5 - YIG FILTER
1 V/cm
5 ms/cm
200 MHz/cm
B

S3-1-TP2
5 V/cm
5 ms/cm
3 MHz/cm
C

S3-1-TP3
2 V/cm
5 ms/cm
3 MHz/cm
D

S3-1-TP5
2 V/cm
5 ms/cm
3 MHz/cm
E

J1 PIN 8 — VCO GAIN
2V/cm
5ms/cm
SCAN WIDTH SET TO 200 MHz
F

NOTES

UNLESS OTHERWISE SPECIFIED:

1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH
4. THESE PARTS USED ON YIG DRIVER HEATSINK ASSY 1A10A32.

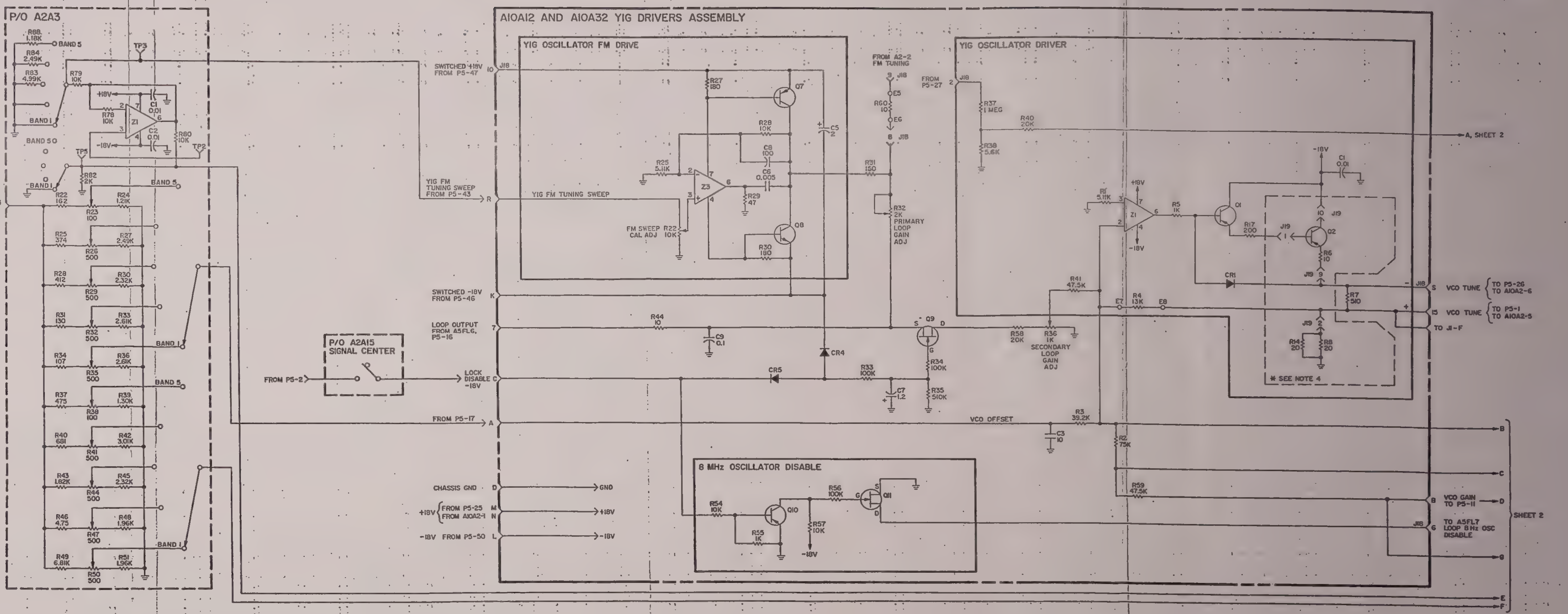
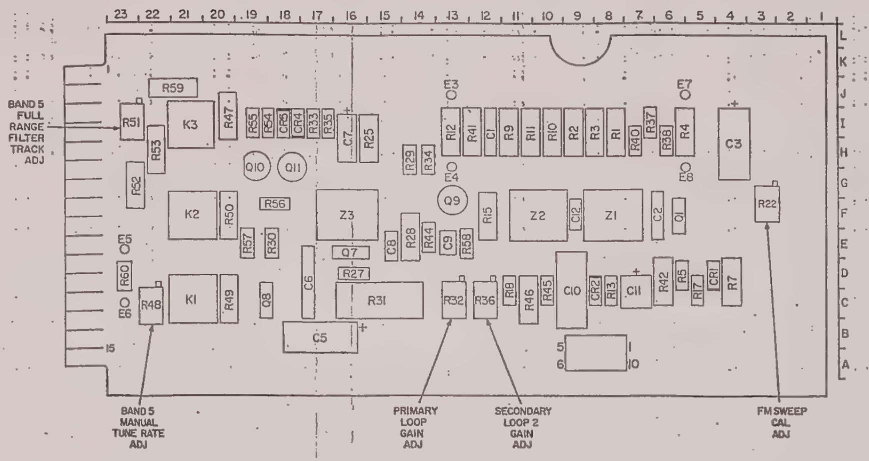

P/O A2A3
R88 1.18K
BAND 5
R84 2.49K
R83 4.99K
BAND 1
TP3
R79 10K
+18V
R78 10K
Z1
C1 0.01
C2 0.01
-18V
R80 10K
TP2
BAND 5
TP5
R82 2K
BAND 1
FROM A2A4 +6V REF
R22 162
R23 100
R24 1.21K
R25 374
R26 500
R27 2.49K
R28 412
R29 500
R30 2.32K
R31 130
R32 500
R33 2.61K
R34 107
R35 500
R36 2.61K
R37 475
R38 100
R39 1.30K
R40 681
R41 500
R42 3.01K
R43 1.82K
R44 500
R45 2.32K
R46 4.75
R47 500
R48 1.96K
R49 6.81K
R50 500
R51 1.96K
BAND 1
BAND 5
BAND 1
P/O A2A15 SIGNAL CENTER
FROM P5-2
SWITCHED +18V FROM P5-47
YIG FM TUNING SWEEP FROM P5-43
SWITCHED -18V FROM P5-46
LOOP OUTPUT FROM A5FL6, P5-16
LOCK DISABLE -18V
FROM P5-17
CHASSIS GND
+18V FROM P5-25 FROM A10A2-1
-18V FROM P5-50
GND
+18V
-18V
A10A12 AND A10A32 YIG DRIVERS ASSEMBLY
YIG OSCILLATOR FM DRIVE
J18
R27 180
Q7
R28 10K
C8 100
C6 0.005
C5 2
R25 5.11K
Z3
R29 47
YIG FM TUNING SWEEP
FM SWEEP CAL ADJ R22 10K
Q8
R30 180
FROM A2-2 FM TUNING
J18
E5
R60 10
E6
R31 150
R32 2K PRIMARY LOOP GAIN ADJ
R44 10
C9 0.1
CR4
CR5
R33 100K
C7 1.2
Q9
R34 100K
R35 510K
VCO OFFSET
8 MHz OSCILLATOR DISABLE
R54 10K
Q10
R55 1K
R56 100K
R57 10K
Q11
-18V
YIG OSCILLATOR DRIVER
FROM P5-27
R37 1 MEG
R40 20K
R38 5.6K
A, SHEET 2
-18V
C1 0.01
+18V
R1 5.11K
Z1
R5 1K
Q1
R17 200
J19
Q2
R6 10
-18V
CR1
R41 47.5K
R4 13K
E7
E8
R7 510
R58 20K
R36 1K SECONDARY LOOP GAIN ADJ
R14 20
R8 20
✱ SEE NOTE 4
VCO TUNE TO P5-26 TO A10A2-6
VCO TUNE TO P5-1 TO A10A2-5
TO J1-F
R3 39.2K
C3 10
R2 75K
R59 47.5K
VCO GAIN TO P5-11
TO A5FL7 LOOP 8 Hz OSC DISABLE
B
C
D
G
E
F
SHEET 2

Figure 7-32. Yig Driver Printed Circuit Board 1A10A12 and Yig Driver Heat Sink 1A10A32, Maintenance Schematic Diagram (Sheet 1 of 2)

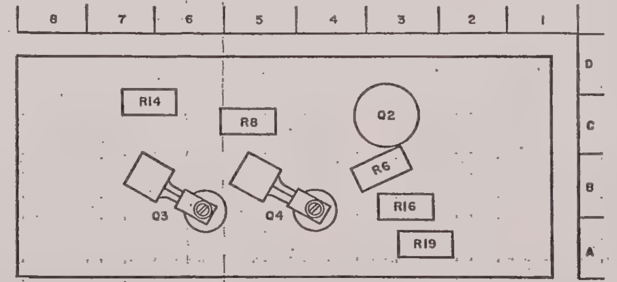
PARTS LOCATION INDEX, YIG DRIVER 1A10A12

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	12I	Q5	NOT USED	R29	14H
C2	6F	Q6	NOT USED	R30	19E
C3	4H	Q7	16E	R31	15C
C4	NOT USED	Q8	19D	R32	13C
C5	17B	Q9	13F	R33	17I
C6	17D	Q10	19H	R34	14H
C7	16I	Q11	18H	R35	17I
C8	15E			R36	12C
C9	13E	R1	8I	R37	6I
C10	9D	R2	9I	R38	6I
C11	7D	R3	8I	R39	NOT USED
C12	9F	R4	5I	R40	7I
		R5	5D	R41	12I
CR1	5D	R6	NOT USED	R42	6D
CR2	8D	R7	4D	R43	NOT USED
CR3	NOT USED	R8	NOT USED	R44	14E
CR4	18I	R9	11I	R45	10D
CR5	18I	R10	10I	R46	11D
		R11	11I	R47	20J
E1	NOT USED	R12	13I	R48	22C
E2	NOT USED	R13	8D	R49	20C
E3	13J	R14	NOT USED	R50	20F
E4	13G	R15	12F	R51	23I
E5	23E	R16	NOT USED	R52	23G
E6	23C	R17	5C	R53	22H
E7	5J	R18	11C	R54	18I
E8	5G	R19	NOT USED	R55	19I
		R20	NOT USED	R56	18F
K1	21C	R21	NOT USED	R57	19E
K2	21F	R22	3F	R58	13E
K3	21I	R23	NOT USED	R59	22J
		R24	NOT USED	R60	23D
Q1	6F	R25	16I		
Q2	NOT USED	R26	NOT USED	Z1	8F
Q3	NOT USED	R27	16D	Z2	11F
Q4	NOT USED	R28	14E	Z3	16F


23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
L K J I H G F E D C B A
BAND 5 FULL RANGE FILTER TRACK ADJ
R59
R51
K3
R53
R52
R47
Q10
Q11
C7
R25
R56
Z3
Q7
R27
R31
C5
K2
K1
R48
R49
R50
R57
R60
Q9
Z2
Z1
C3
R22
C10
C11
R32
R36
R46
BAND 5 MANUAL TUNE RATE ADJ
PRIMARY LOOP GAIN ADJ
SECONDARY LOOP 2 GAIN ADJ
FM SWEEP CAL ADJ

PARTS LOCATION INDEX, YIG DRIVER HEAT SINK 1A10A32

REFERENCE DESIGNATION	ZONE
Q2	3C
Q3	6B
Q4	5B
R6	3B
R8	5C
R14	7D
R16	3B
R19	3A


8 7 6 5 4 3 2 1
D C B A
R14
R8
Q2
R6
R16
R19
Q3
Q4

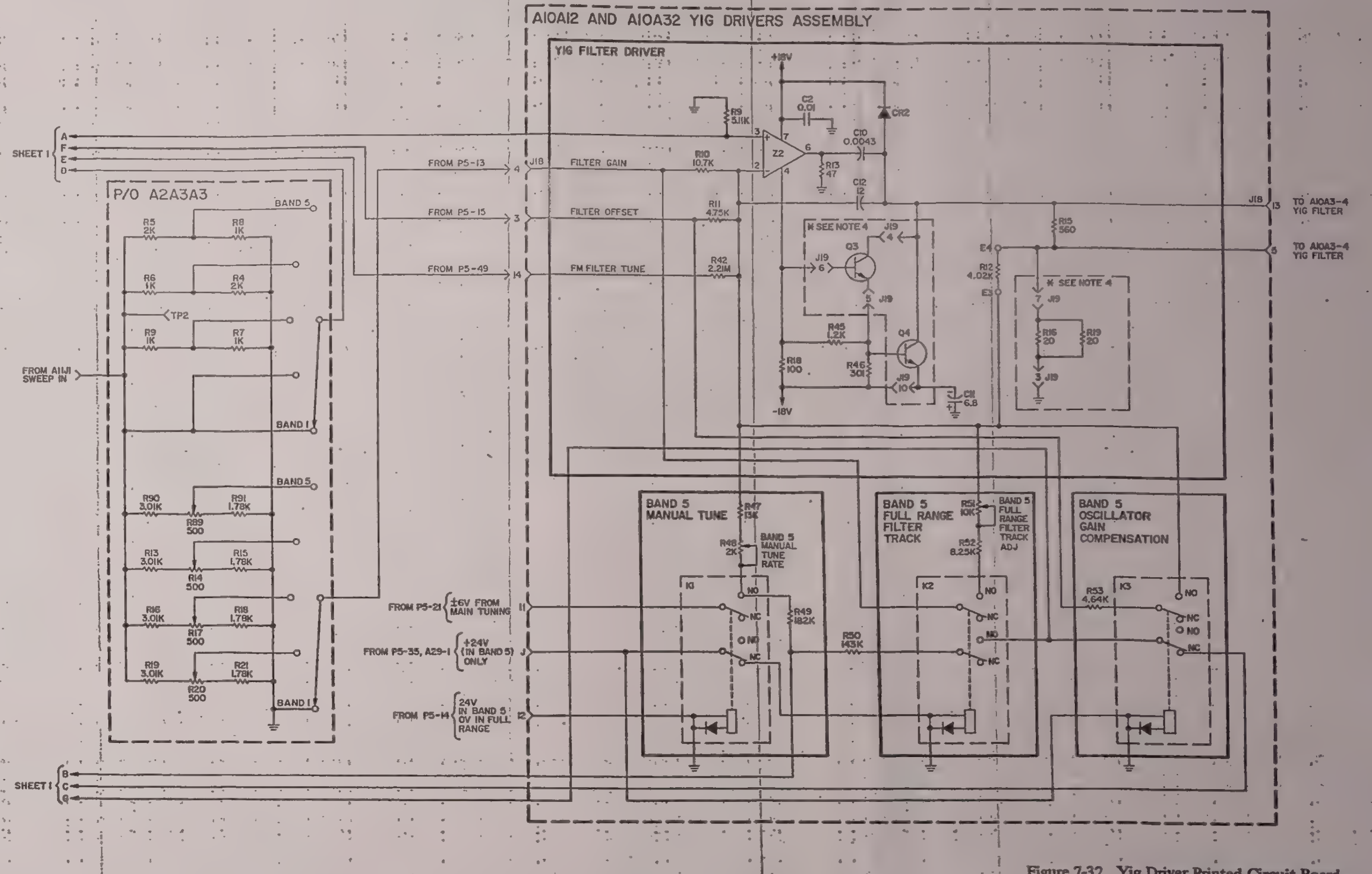
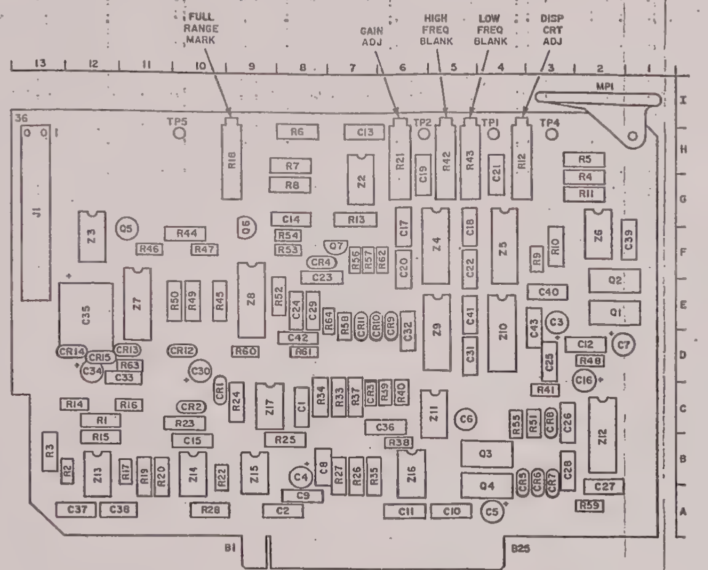

A10A12 AND A10A32 YIG DRIVERS ASSEMBLY
YIG FILTER DRIVER
SHEET 1
A
F
E
D
P/O A2A3A3
BAND 5
R5 2K
R8 1K
R6 1K
R4 2K
TP2
R9 1K
R7 1K
FROM A1J1 SWEEP IN
BAND 1
BAND 5
R90 3.01K
R89 500
R91 1.78K
R13 3.01K
R14 500
R15 1.78K
R16 3.01K
R17 500
R18 1.78K
R19 3.01K
R20 500
R21 1.78K
BAND 1
FROM P5-13
FROM P5-15
FROM P5-49
J18
FILTER GAIN
FILTER OFFSET
FM FILTER TUNE
R9 5.11K
+18V
C2 0.01
CR2
Z2
C10 0.0043
R10 10.7K
R13 47
R11 4.75K
C12 12
R42 2.21M
✱ SEE NOTE 4
J19
Q3
Q4
R45 1.2K
R18 100
R46 301
C11 6.8
-18V
E4
E3
R12 4.02K
R15 560
R16 20
R19 20
TO A10A3-4 YIG FILTER
TO A10A3-4 YIG FILTER
FROM P5-21 ±6V FROM MAIN TUNING
FROM P5-35, A29-1 +24V (IN BAND 5) ONLY
FROM P5-14 24V IN BAND 5 0V IN FULL RANGE
BAND 5 MANUAL TUNE
R47 13K
R48 2K
BAND 5 MANUAL TUNE RATE
K1
NO
NC
R49 182K
R50 143K
BAND 5 FULL RANGE FILTER TRACK
R51 10K
BAND 5 FULL RANGE FILTER TRACK ADJ
R52 8.25K
K2
BAND 5 OSCILLATOR GAIN COMPENSATION
R53 4.64K
K3
SHEET 1
B
C
G

Figure 7-32. Yig Driver Printed Circuit Board 1A10A12 and Yig Driver Heat Sink 1A10A32, Maintenance Schematic Diagram (Sheet 2 of 2)

7-87/88 blank

PARTS LOCATION INDEX, SWEEP GENERATOR 1A11

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	8C	C41	5E	R10	3F	R50	10E
C2	9A	C42	8D	R11	2G	R51	3C
C3	3E	C43	3E	R12	4H	R52	8E
C4	8B			R13	7G	R53	8F
C5	5A	CR1	10C	R14	12C	R54	8F
C6	5C	CR2	10C	R15	12B	R55	4C
C7	5C	CR3	7C	R16	11C	R56	7F
C8	8B	CR4	8F	R17	12B	R57	7F
C9	8A	CR5	4B	R18	9H	R58	7E
C10	5A	CR6	4B	R19	11B	R59	2A
C11	6A	CR7	3B	R20	11B	R60	9D
C12	2D	CR8	3C	R21	6H	R61	8D
C13	7H	CR9	6E	R22	10B	R62	6F
C14	8G	CR10	7E	R23	10C	R63	11D
C15	10B	CR11	7E	R24	9C	R64	8E
C16	2D	CR12	10D	R25	8B		
C17	6G	CR13	12D	R26	7B	TP1	4I
C18	6F	CR14	13D	R27	7B	TP2	6I
C19	6H	CR15	12D	R28	10A	TP3	NOT USED
C20	6F			R29	NOT USED	TP4	3I
C21	4H	J1	13G	R30	NOT USED	TP5	10I
C22	5F	MP1	2I	R31	NOT USED		
C23	8E			R32	NOT USED	Z1	NOT USED
C24	8E	Q1	2E	R33	7C	Z2	7H
C25	3D	Q2	2E	R34	8C	Z3	12F
C26	3C	Q3	4B	R35	7B	Z4	5F
C27	2B	Q4	4B	R36	NOT USED	Z5	4F
C28	3B	Q5	11F	R37	7C	Z6	2F
C29	8E	Q6	9G	R38	6B	Z7	11E
C30	10D	Q7	7F	R39	7C	Z8	9E
C31	5D			R40	6C	Z9	5D
C32	6E	R1	12C	R41	3C	Z10	4D
C33	12D	R2	12B	R42	5H	Z11	6C
C34	12D	R3	13B	R43	5H	Z12	2B
C35	12E	R4	2G	R44	10F	Z13	12B
C36	6C	R5	2H	R45	10E	Z14	10B
C37	19A	R6	8H	R46	11F	Z15	9B
C38	12A	R7	8H	R47	10F	Z16	6B
C39	1F	R8	8G	R48	2D	Z17	9C
C40	3E	R9	3F	R49	10E		


FULL RANGE MARK
GAIN ADJ
HIGH FREQ BLANK
LOW FREQ BLANK
DISP CRT ADJ
13
12
11
10
9
8
7
6
5
4
3
2
1
MP1
I
H
G
F
E
D
C
B
A
TP5
TP2
TP1
TP4
J1
B1
B25

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH

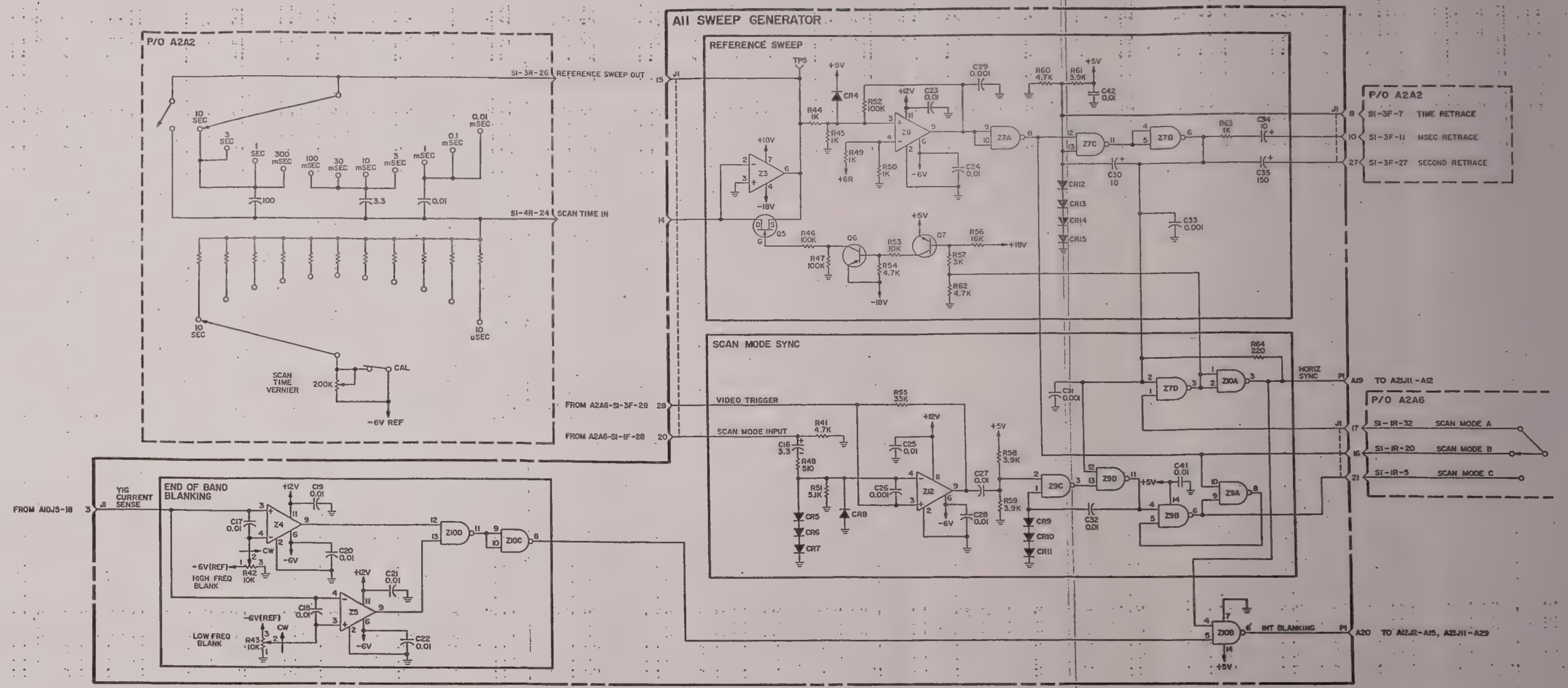
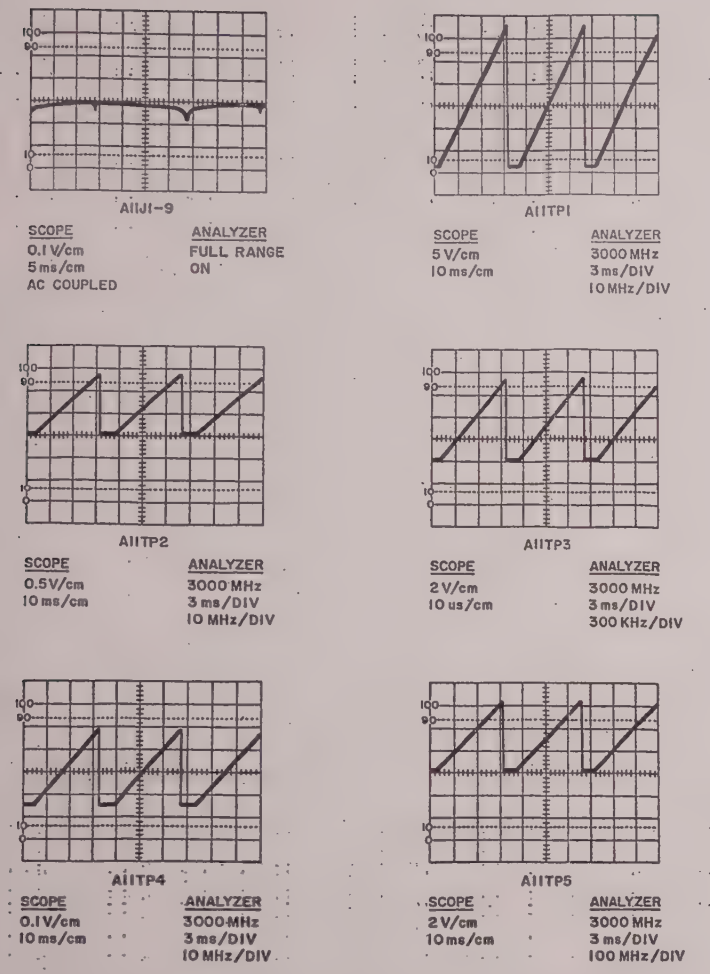

P/O A2A2
SI-3R-26
REFERENCE SWEEP OUT
SI-4R-24
SCAN TIME IN
10 SEC
3 SEC
1 SEC
300 mSEC
100 mSEC
30 mSEC
10 mSEC
3 mSEC
1 mSEC
0.1 mSEC
0.01 mSEC
10 uSEC
SCAN TIME VERNIER
200K
CAL
-6V REF
A11 SWEEP GENERATOR
REFERENCE SWEEP
SCAN MODE SYNC
VIDEO TRIGGER
SCAN MODE INPUT
FROM A2A6-SI-3F-28
FROM A2A6-SI-1F-28
END OF BAND BLANKING
YIG CURRENT SENSE
FROM A10J5-18
HIGH FREQ BLANK
LOW FREQ BLANK
P/O A2A2
SI-3F-7
TIME RETRACE
SI-3F-11
MSEC RETRACE
SI-3F-27
SECOND RETRACE
HORIZ SYNC
TO A5J11-A12
P/O A2A6
SI-IR-32
SCAN MODE A
SI-IR-20
SCAN MODE B
SI-IR-5
SCAN MODE C
INT BLANKING
TO A12J2-A15, A25J11-A29
+5V

Figure 7-33. Sweep Generator Printed Circuit Board 1A11, Maintenance Schematic Diagram (Sheet 1 of 2)

7-89/90 blank



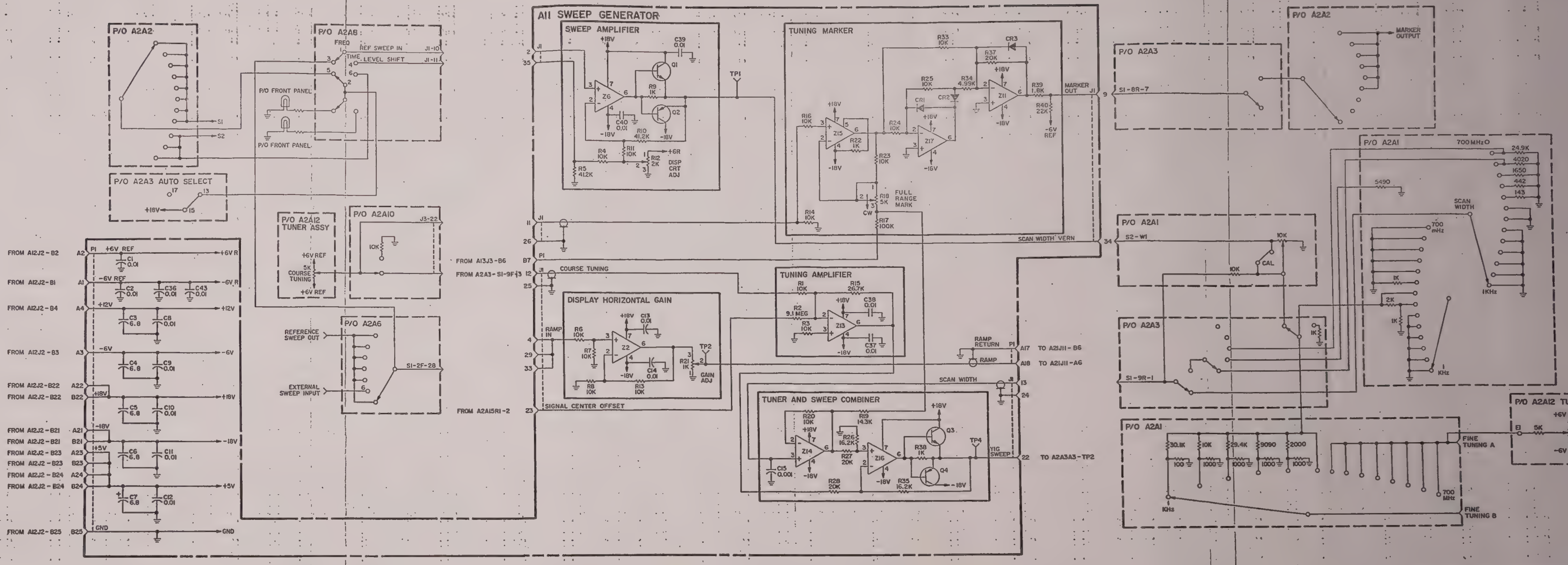
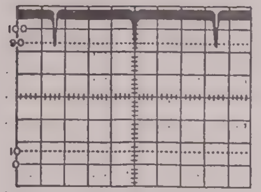

P/O A2A2
S1
S2
P/O A2A8
FREQ
TIME
REF SWEEP IN
LEVEL SHIFT
J1-10
J1-11
P/O FRONT PANEL
P/O FRONT PANEL
P/O A2A3 AUTO SELECT
+18V
P/O A2A12 TUNER ASSY
+6V REF
5K COURSE TUNING
P/O A2A10
J3-22
10K
P/O A2A6
REFERENCE SWEEP OUT
EXTERNAL SWEEP INPUT
S1-2F-28
FROM A12J2-B2
FROM A12J2-B1
FROM A12J2-B4
FROM A12J2-B3
FROM A12J2-B22
FROM A12J2-B22
FROM A12J2-B21
FROM A12J2-B21
FROM A12J2-B23
FROM A12J2-B23
FROM A12J2-B24
FROM A12J2-B24
FROM A12J2-B25
P1
+6V REF
-6V REF
+12V
-6V
+18V
-18V
+5V
GND
+6V R
-6V R
C1 0.01
C2 0.01
C36 0.01
C43 0.01
C3 6.8
C8 0.01
C4 6.8
C9 0.01
C5 6.8
C10 0.01
C6 6.8
C11 0.01
C7 6.8
C12 0.01
FROM A13J3-B6
FROM A2A3-S1-9F-13
FROM A2A15R1-2
A11 SWEEP GENERATOR
SWEEP AMPLIFIER
Z6
Q1
Q2
C39 0.01
C40 0.01
R9 1K
R10 41.2K
R4 10K
R11 10K
R12 2K
R5 41.2K
DISP CRT ADJ
+6R
TP1
TUNING MARKER
Z15
Z17
Z11
R16 10K
R22 1K
R24 10K
R23 10K
R25 10K
R34 4.99K
R33 10K
R37 20K
CR1
CR2
CR3
R39 1.8K
R40 22K
-6V REF
R18 5K
FULL RANGE MARK
CW
R14 10K
R17 100K
MARKER OUT
SCAN WIDTH VERN
COURSE TUNING
DISPLAY HORIZONTAL GAIN
RAMP IN
Z2
R6 10K
R7 10K
R8 10K
R13 10K
C13 0.01
C14 0.01
R21 1K
GAIN ADJ
TP2
SIGNAL CENTER OFFSET
TUNING AMPLIFIER
Z13
R1 10K
R15 26.7K
R2 9.1 MEG
R3 10K
C38 0.01
C37 0.01
RAMP RETURN
RAMP
TO A21J11-B6
TO A21J11-A6
SCAN WIDTH
TUNER AND SWEEP COMBINER
Z14
Z16
Q3
Q4
R20 10K
R19 14.3K
R26 16.2K
R27 20K
R28 20K
R38 1K
R35 16.2K
C15 0.001
TP4
YIG SWEEP
TO A2A3A3-TP2
P/O A2A3
S1-8R-7
P/O A2A2
MARKER OUTPUT
P/O A2A1
S2-W1
10K
CAL
P/O A2A1
700 MHz
24.9K
4020
1650
442
143
5490
SCAN WIDTH
1K
2K
1 KHz
P/O A2A3
S1-9R-1
P/O A2A1
30.1K
10K
29.4K
9090
2000
100
1000
FINE TUNING A
FINE TUNING B
P/O A2A12 TUNER ASSY
+6V REF
5K
5.1 FINE TUNING
-6V REF

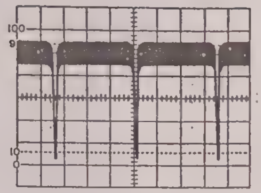
Figure 7-33. Sweep Generator Printed Circuit Board 1A11, Maintenance Schematic Diagram (Sheet 2 of 2)



A12TP1

SCOPE
1 V/cm
10 ms/cm

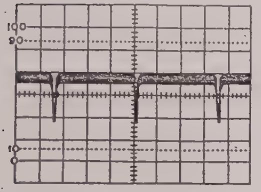
ANALYZER
3000 MHz
10 dB/DIV
10 MHz/DIV
3 ms/DIV
RF/IF ATTEN 0 dB
AUTO ALL



A12TP2

SCOPE
0.2 V/cm
10 ms/cm

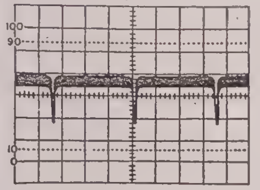
ANALYZER
3000 MHz
10 dB
10 MHz/DIV
3 us/DIV
RF/IF ATTEN 0 dB
AUTO ALL
VIDEO FILTER ON



A12TP2

SCOPE
0.5 V/cm
10 ms/cm

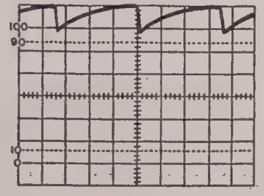
ANALYZER
3000 MHz
10 dB
10 MHz/DIV
3 ms/DIV
RF/IF ATTEN 0 dB
AUTO ALL
VIDEO FILTER OFF



A12TP3

SCOPE
0.5 V/cm
10 ms/cm

ANALYZER
3000 MHz
10 dB
10 MHz/DIV
3 us/DIV
RF/IF ATTEN 0dB
AUTO ALL
VIDEO FILTER OFF



A12TP3

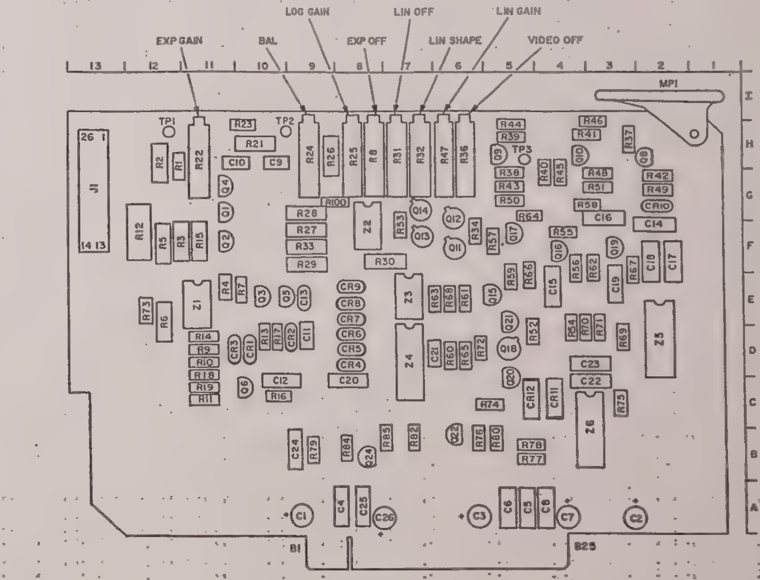
SCOPE
0.1 V/cm
10 ms/cm

ANALYZER
3000 MHz
10 dB
10 MHz/DIV
3 ms/DIV
RF/IF ATTEN 0dB
AUTO ALL
VIDEO FILTER ON

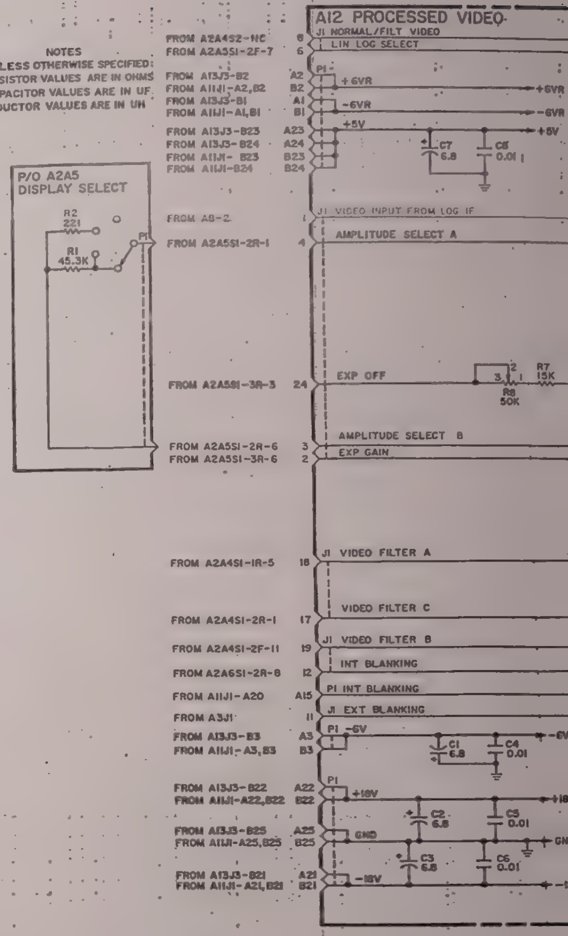
PARTS LOCATION INDEX, PROCESSED VIDEO 1A12

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	10A	Q10	4H	R36	6H	R89	NOT USED
C2	3A	Q11	6F	R37	3H	R100	9G
C3	6A	Q12	6G	R38	5G		
C4	9A	Q13	7F	R39	5H	TP1	12H
C5	5A	Q14	7G	R40	4G	TP2	10H
C6	5A	Q15	6E	R41	3H	TP3	5H
C7	4A	Q16	4F	R42	2G		
C8	4A	Q17	5F	R43	5G	Z1	11E
C9	10H	Q18	5D	R44	5H	Z2	8F
C10	10H	Q19	3F	R45	4G	Z3	7E
C11	9D	Q20	5C	R46	3H	Z4	7D
C12	10C	Q21	5E	R47	6H	Z5	2D
C13	9E	Q22	6B	R48	3G	Z6	3C
C14	2F	Q23	NOT USED	R49	2G		
C15	4E	Q24	8B	R50	5G		
C16	3G			R51	3G		
C17	2F	R1	12H	R52	5D		
C18	2F	R2	12H	R53	7F		
C19	3E	R3	12F	R54	4D		
C20	8D	R4	11E	R55	4F		
C21	7D	R5	12F	R56	4F		
C22	4C	R6	12E	R57	6F		
C23	4D	R7	10E	R58	3G		
C24	9B	R8	8H	R59	5E		
C25	8A	R9	11D	R60	6D		
C26	8A	R10	11D	R61	6E		
		R11	11C	R62	3F		
CR1	10D	R12	12F	R63	7E		
CR2	10D	R13	10D	R64	5G		
CR3	11D	R14	11D	R65	6D		
CR4	8D	R15	11F	R66	5F		
CR5	8D	R16	10C	R67	3F		
CR6	8D	R17	10D	R68	6E		
CR7	8E	R18	11D	R69	3D		
CR8	8E	R19	11C	R70	4D		
CR9	8E	R20	NOT USED	R71	3D		
CR10	2G	R21	10H	R72	6D		
CR11	4C	R22	11H	R73	12E		
CR12	5C	R23	10H	R74	6C		
		R24	9H	R75	3C		
J1	13G	R25	8H	R76	6B		
		R26	9H	R77	5B		
MP1	2I	R27	9F	R78	5B		
		R28	10G	R79	9B		
Q1	11G	R29	9F	R80	5B		
Q2	11F	R30	7F	R81	NOT USED		
Q3	10E	R31	7H	R82	7B		
Q4	11G	R32	7H	R83	NOT USED		
Q5	10E	R33	9F	R84	8B		
Q6	10C	R34	6F	R85	8N		
Q7	NOT USED	R35	NOT USED	R86	NOT USED		
Q8	2H			R87	NOT USED		
Q9	5H						

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH.


EXP GAIN
BAL
LOG GAIN
EXP OFF
LIN OFF
LIN SHAPE
LIN GAIN
VIDEO OFF
13
12
11
10
9
8
7
6
5
4
3
2
1
MP1
I
H
G
F
E
D
C
B
A
TP1
TP2
TP3
J1
26 1
14 13
B1
B25

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH


A12 PROCESSED VIDEO
J1 NORMAL/FILT VIDEO
LIN LOG SELECT
FROM A2A4S2-NC 8
FROM A2A5S1-2F-7 6
FROM A13J3-B2 A2
FROM A11J1-A2,B2 B2
FROM A13J3-B1 A1
FROM A11J1-A1,B1 B1
FROM A13J3-B23 A23
FROM A13J3-B24 A24
FROM A11J1-B23 B23
FROM A11J1-B24 B24
P1
+6VR
-6VR
+5V
C7 6.8
C8 0.01
P/O A2A5
DISPLAY SELECT
R2 221
R1 45.3K
J1 VIDEO INPUT FROM LOG IF
FROM A8-2 1
AMPLITUDE SELECT A
FROM A2A5S1-2R-1 4
EXP OFF
FROM A2A5S1-3R-3 24
R8 50K
R7 15K
AMPLITUDE SELECT B
FROM A2A5S1-2R-6 3
EXP GAIN
FROM A2A5S1-3R-6 2
J1 VIDEO FILTER A
FROM A2A4S1-1R-5 18
VIDEO FILTER C
FROM A2A4S1-2R-1 17
J1 VIDEO FILTER B
FROM A2A4S1-2F-11 19
INT BLANKING
FROM A2A6S1-2R-8 12
P1 INT BLANKING
FROM A11J1-A20 A15
J1 EXT BLANKING
FROM A3J1 11
P1 -6V
FROM A13J3-B3 A3
FROM A11J1-A3,B3 B3
C1 6.8
C4 0.01
+18V
FROM A13J3-B22 A22
FROM A11J1-A22,B22 B22
C2 6.8
C5 0.01
GND
FROM A13J3-B25 A25
FROM A11J1-A25,B25 B25
C3 6.8
C6 0.01
-18V
FROM A13J3-B21 A21
FROM A11J1-A21,B21 B21

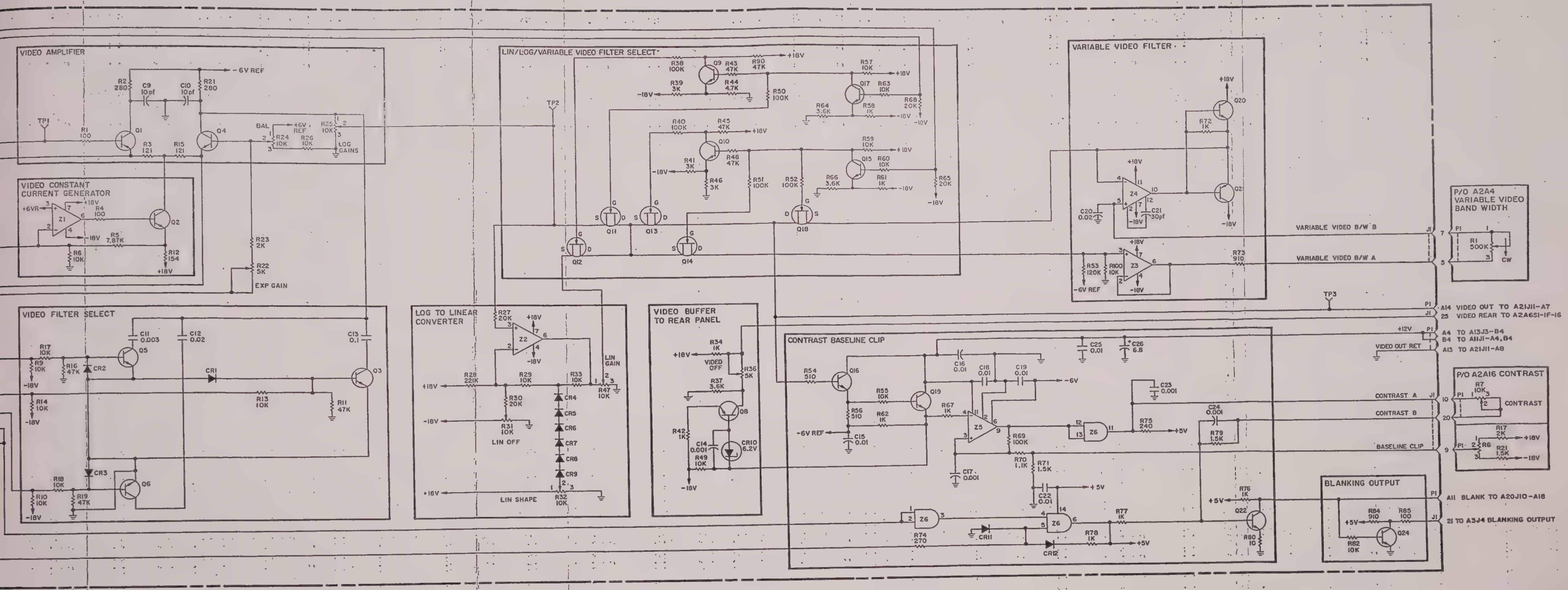
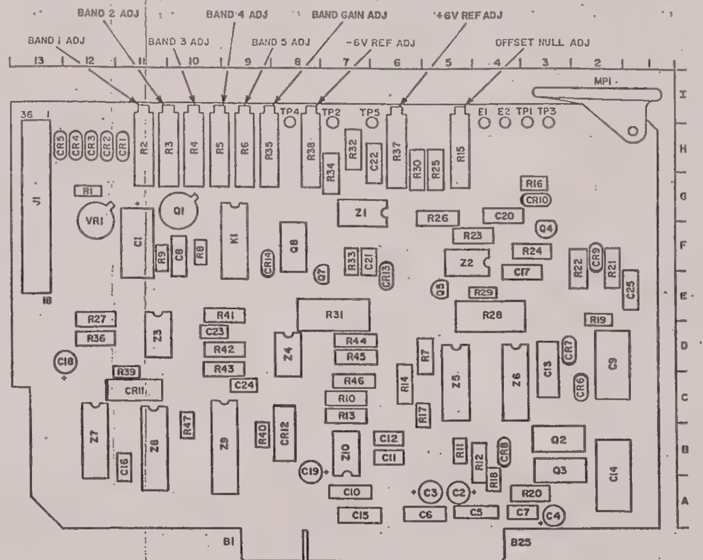

VIDEO AMPLIFIER
VIDEO CONSTANT CURRENT GENERATOR
VIDEO FILTER SELECT
LIN/LOG/VARIABLE VIDEO FILTER SELECT
LOG TO LINEAR CONVERTER
VIDEO BUFFER TO REAR PANEL
CONTRAST BASELINE CLIP
VARIABLE VIDEO FILTER
BLANKING OUTPUT
P/O A2A4 VARIABLE VIDEO BAND WIDTH
P/O A2A16 CONTRAST
TP1
TP2
TP3
EXP GAIN
LOG GAINS
LIN GAIN
LIN OFF
LIN SHAPE
VIDEO OFF
VARIABLE VIDEO B/W B
VARIABLE VIDEO B/W A
A14 VIDEO OUT TO A21J11-A7
25 VIDEO REAR TO A2A6S1-IF-16
A4 TO A13J3-B4
B4 TO A11J1-A4, B4
A13 TO A21J11-A8
VIDEO OUT RET
CONTRAST A
CONTRAST B
BASELINE CLIP
A11 BLANK TO A20J10-A18
21 TO A3J4 BLANKING OUTPUT
CONTRAST
CW

Figure 7-34. Processed Video Printed Circuit Board 1A12, Maintenance Schematic Diagram

7-93/94 blank

PARTS LOCATION INDEX, REGULATOR BIAS 1A13

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	11F	E2	4I	R28	4E
C2	5A			R29	4E
C3	5A	K1	9F	R30	6H
C4	3A			R31	7E
C5	5A	MP1	2I	R32	7H
C6	5A			R33	7F
C7	3A	Q1	10G	R34	7H
C8	10F	Q2	3B	R35	9H
C9	2D	Q3	3B	R36	12D
C10	7A	Q4	3F	R37	6H
C11	6B	Q5	5E	R38	8H
C12	6B	Q6	NOT USED	R39	11C
C13	3D	Q7	8F	R40	9B
C14	2A	Q8	8F	R41	9E
C15	7A			R42	9D
C16	12B	R1	12G	R43	9D
C17	4E	R2	11H	R44	7D
C18	13D	R3	11H	R45	7D
C19	8B	R4	10H	R46	6C
C20	4G	R5	10H	R47	10B
C21	6F	R6	9H		
C22	6H	R7	6D	TP1	3I
C23	10D	R8	10F	TP2	7I
C24	9C	R9	11F	TP3	3I
C25	1E	R10	7C	TP4	8I
		R11	5B	TP5	6I
CR1	11H	R12	4B		
CR2	12H	R13	7C	VR1	12F
CR3	12H	R14	6C		
CR4	12H	R15	5H	Z1	7G
CR5	13H	R16	3G	Z2	5F
CR6	2C	R17	6C	Z3	11D
CR7	3D	R18	4A	Z4	8D
CR8	4B	R19	2E	Z5	5C
CR9	2F	R20	4A	Z6	4C
CR10	3G	R21	2F	Z7	12B
CR11	11C	R22	2F	Z8	11B
CR12	8B	R23	5F	Z9	10B
CR13	6E	R24	3F	Z10	7B
CR14	9F	R25	5H		
		R26	5G		
E1	4I	R27	12E		


BAND 1 ADJ
BAND 2 ADJ
BAND 3 ADJ
BAND 4 ADJ
BAND 5 ADJ
BAND GAIN ADJ
-6V REF ADJ
+6V REF ADJ
OFFSET NULL ADJ
13
12
11
10
9
8
7
6
5
4
3
2
1
MP1
I
H
G
F
E
D
C
B
A
J1
E1
E2
TP1
TP2
TP3
TP4
TP5
B1
B25

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH

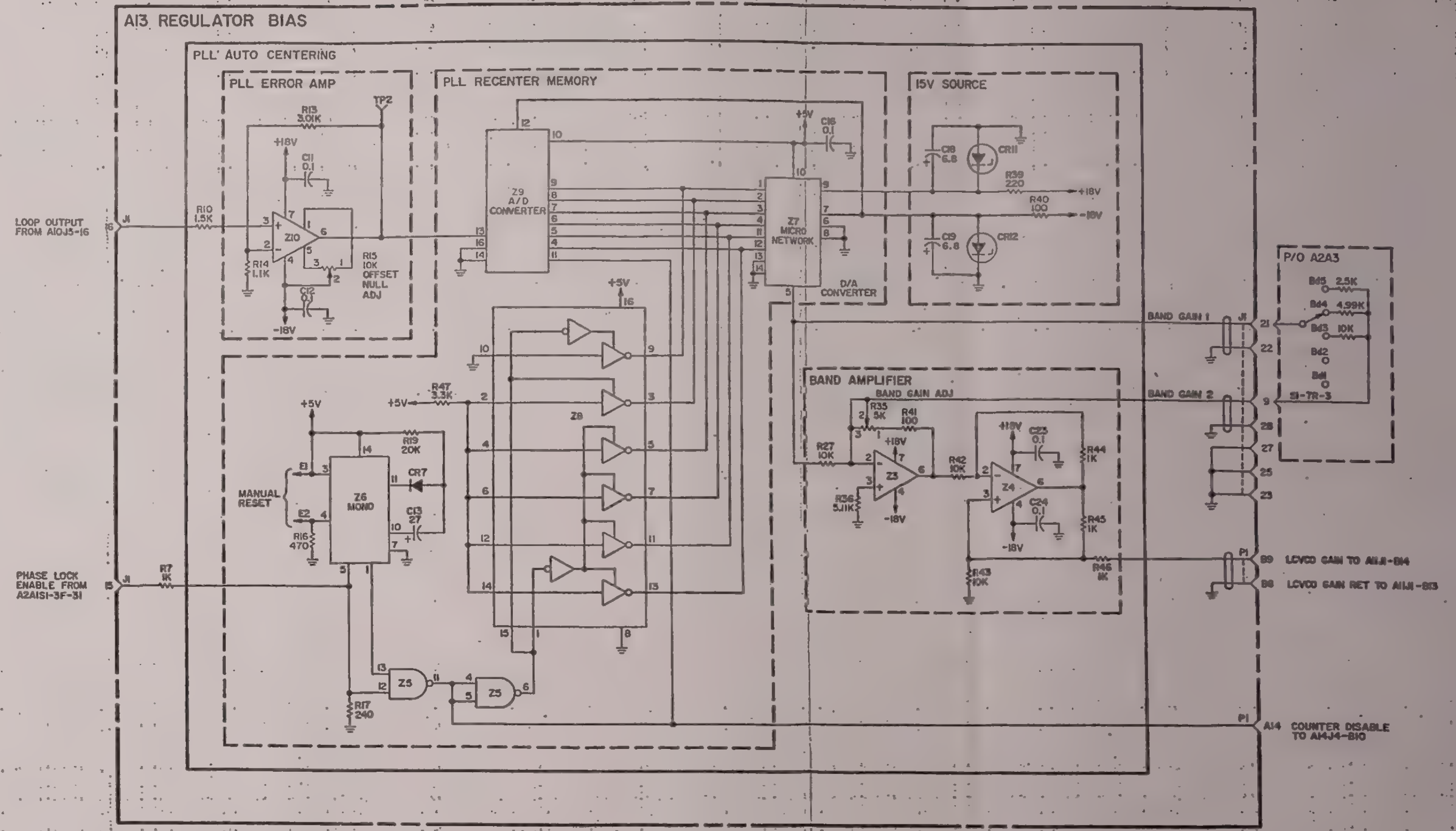

A13 REGULATOR BIAS
PLL AUTO CENTERING
PLL ERROR AMP
PLL RECENTER MEMORY
15V SOURCE
BAND AMPLIFIER
BAND GAIN ADJ
D/A CONVERTER
Z9 A/D CONVERTER
Z7 MICRO NETWORK
Z6 MONO
Z10
Z8
Z5
Z3
Z4
R15 10K OFFSET NULL ADJ
MANUAL RESET
LOOP OUTPUT FROM A10J5-16
PHASE LOCK ENABLE FROM A2A1S1-3F-31
BAND GAIN 1
BAND GAIN 2
P/O A2A3
S1-7R-3
LCVCO GAIN TO A11J1-B14
LCVCO GAIN RET TO A11J1-B13
COUNTER DISABLE TO A14J4-B10
+18V
-18V
+5V

Figure 7-35. Regulator Bias Printed Circuit Board 1A13, Maintenance Schematic Diagram (Sheet 1 of 2)

7-95/96 blank

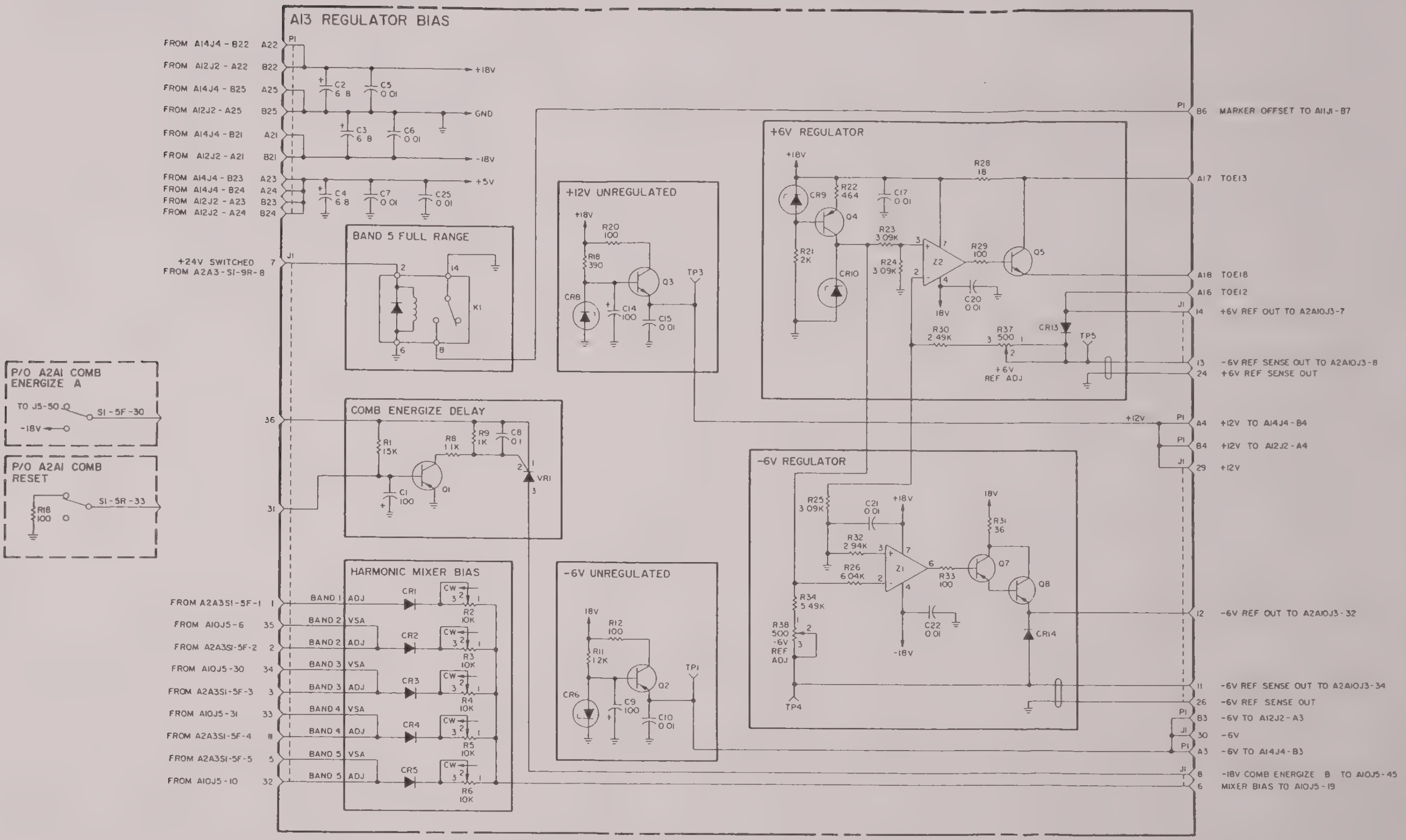
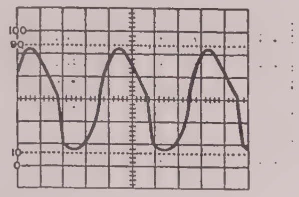
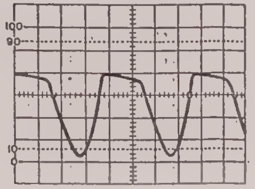

A13 REGULATOR BIAS
FROM A14J4 - B22 A22
FROM A12J2 - A22 B22
FROM A14J4 - B25 A25
FROM A12J2 - A25 B25
FROM A14J4 - B21 A21
FROM A12J2 - A21 B21
FROM A14J4 - B23 A23
FROM A14J4 - B24 A24
FROM A12J2 - A23 B23
FROM A12J2 - A24 B24
P1
+18V
GND
-18V
+5V
C2 6.8
C5 0.01
C3 6.8
C6 0.01
C4 6.8
C7 0.01
C25 0.01
+24V SWITCHED FROM A2A3-S1-9R-8 7
J1
BAND 5 FULL RANGE
K1
+12V UNREGULATED
+18V
R20 100
R18 390
Q3
TP3
CR8
C14 100
C15 0.01
+6V REGULATOR
+18V
CR9
R22 464
Q4
C17 0.01
R28 18
R23 3.09K
R24 3.09K
R21 2K
CR10
Z2
R29 100
Q5
C20 0.01
18V
R30 2.49K
R37 500
+6V REF ADJ
CR13
TP5
B6 MARKER OFFSET TO A11J1-B7
A17 TOE13
A18 TOE18
A16 TOE12
14 +6V REF OUT TO A2A10J3-7
13 -6V REF SENSE OUT TO A2A10J3-8
24 +6V REF SENSE OUT
+12V
A4 +12V TO A14J4-B4
B4 +12V TO A12J2-A4
29 +12V
P/O A2A1 COMB ENERGIZE A
TO J5-50
S1-5F-30
-18V
P/O A2A1 COMB RESET
R18 100
S1-5R-33
36
31
COMB ENERGIZE DELAY
R1 15K
R8 1.1K
R9 1K
C8 0.1
VR1
Q1
C1 100
-6V REGULATOR
R25 3.09K
C21 0.01
+18V
R32 2.94K
R26 6.04K
Z1
R33 100
18V
R31 36
Q7
Q8
C22 0.01
-18V
R34 5.49K
R38 500 -6V REF ADJ
CR14
TP4
12 -6V REF OUT TO A2A10J3-32
11 -6V REF SENSE OUT TO A2A10J3-34
26 -6V REF SENSE OUT
B3 -6V TO A12J2-A3
30 -6V
A3 -6V TO A14J4-B3
8 -18V COMB ENERGIZE B TO A10J5-45
6 MIXER BIAS TO A10J5-19
-6V UNREGULATED
18V
R12 100
R11 1.2K
Q2
TP1
CR6
C9 100
C10 0.01
HARMONIC MIXER BIAS
FROM A2A3S1-5F-1 1
FROM A10J5-6 35
FROM A2A3S1-5F-2 2
FROM A10J5-30 34
FROM A2A3S1-5F-3 3
FROM A10J5-31 33
FROM A2A3S1-5F-4 4
FROM A2A3S1-5F-5 5
FROM A10J5-10 32
BAND 1 ADJ
BAND 2 VSA
BAND 2 ADJ
BAND 3 VSA
BAND 3 ADJ
BAND 4 VSA
BAND 4 ADJ
BAND 5 VSA
BAND 5 ADJ
CR1
CR2
CR3
CR4
CR5
CW
R2 10K
R3 10K
R4 10K
R5 10K
R6 10K

Figure 7-35. Regulator Bias Printed Circuit Board 1A13, Maintenance Schematic Diagram (Sheet 2 of 2)



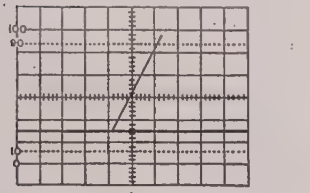
A14 CRYSTAL 270 uH SIDE

SCOPE	ANALYZER
1 V/cm	3000 MHz
1 us/cm	ALL NORMAL



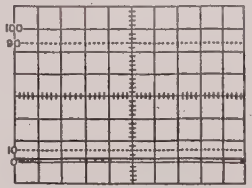
A14 CRYSTAL 33 KΩ SIDE

SCOPE	ANALYZER
1 V/cm	3000 MHz
1 us/cm	ALL NORMAL



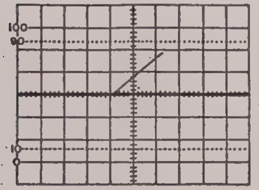
A14TP2, TP1

SCOPE	ANALYZER
5 V/cm	3000 MHz
10 ms/cm	ALL NORMAL



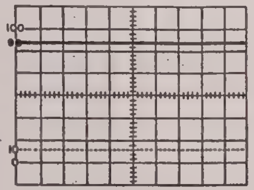
A14Z1-6

SCOPE	ANALYZER
5 V/cm	3000 MHz
10 ms/cm	ALL NORMAL



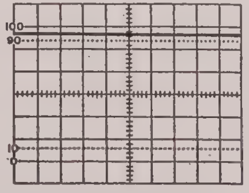
A14Z6-6, TP1

SCOPE	ANALYZER
5 V/cm	3000 MHz
10 ms/cm	ALL NORMAL



A14Z11 PIN 3

SCOPE	ANALYZER
50 MV/cm	3000 MHz
10 ms/cm	ALL NORMAL

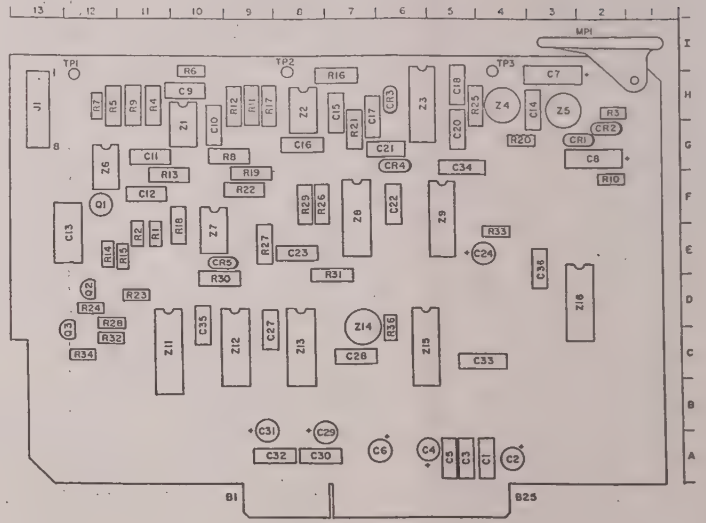


A14Z13 PIN 11

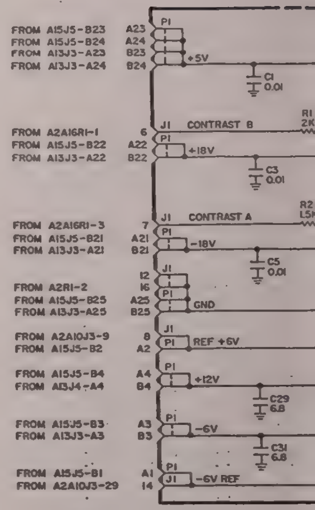
SCOPE	ANALYZER
0.05 V/cm	3000 MHz
10 ms/cm	ALL NORMAL

PARTS LOCATION INDEX, DIGITAL DISPLAY NO. 2 1A14

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	4A	CR1	2G	R23	11D
C2	4A	CR2	2G	R24	12D
C3	5A	CR3	6H	R25	5H
C4	6A	CR4	6G	R26	7F
C5	5A	CR5	10E	R27	9E
C6	6A			R28	12D
C7	3H	J1	13H	R29	8F
C8	2G			R30	10D
C9	10H	MP1	2I	R31	7E
C10	10H			R32	12C
C11	11G	Q1	12F	R33	4E
C12	11F	Q2	12D	R34	12C
C13	12E	Q3	12D	R35	NOT USED
C14	3H			R36	7D
C15	7H	R1	11E		
C16	8G	R2	11E	TP1	12I
C17	7H	R3	2H	TP2	8I
C18	5H	R4	11H	TP3	4I
C19	NOT USED	R5	12H		
C20	5G	R6	10H		
C21	6G	R7	12H	Z1	10G
C22	6F	R8	9G	Z2	8H
C23	8E	R9	11H	Z3	6H
C24	4E	R10	2F	Z4	4H
C25	NOT USED	R11	9H	Z5	3H
C26	NOT USED	R12	9H	Z6	12G
C27	9D	R13	10G	Z7	10E
C28	7C	R14	12E	Z8	7F
C29	8B	R15	11E	Z9	5F
C30	8A	R16	7H	Z10	NOT USED
C31	9B	R17	9H	Z11	11C
C32	9A	R18	10E	Z12	10C
C33	4C	R19	19F	Z13	8C
C34	5G	R20	4G	Z14	7C
C35	10D	R21	7H	Z15	6C
C36	3E	R22	9F	Z16	2E


13
12
11
10
9
8
7
6
5
4
3
2
1
I
H
G
F
E
D
C
B
A
MP1
TP1
TP2
TP3
J1
R6
R16
C7
C9
R7
R5
R9
R4
Z1
C10
R12
R11
R17
Z2
C15
R21
C17
CR3
Z3
C18
R25
Z4
C14
Z5
R3
CR2
CR1
C20
R20
C16
C21
CR4
C34
C8
R10
C11
R8
Z6
R13
R19
R22
C12
Q1
R29
R26
Z8
C22
Z9
C13
R2
R1
R18
Z7
R27
C23
R33
C24
R14
R15
CR5
C36
R30
R31
Q2
R23
Z16
R24
R28
Q3
R32
Z11
C35
Z12
C27
Z13
Z14
R36
Z15
R34
C28
C33
C31
C29
C32
C30
C6
C4
C5
C3
C1
C2
B1
B25

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH


FROM A15J5-B23
FROM A15J5-B24
FROM A13J3-A23
FROM A13J3-A24
A23
A24
B23
B24
P1
+5V
C1
0.01
FROM A2A16R1-1
FROM A15J5-B22
FROM A13J3-A22
6
A22
B22
J1
CONTRAST B
R1
2K
+18V
C3
0.01
FROM A2A16R1-3
FROM A15J5-B21
FROM A13J3-A21
7
A21
B21
CONTRAST A
R2
1.5K
-18V
C5
0.01
12
FROM A2R1-2
FROM A15J5-B25
FROM A13J3-A25
16
A25
B25
GND
FROM A2A10J3-9
FROM A15J5-B2
8
A2
REF +6V
FROM A15J5-B4
FROM A13J4-A4
A4
B4
+12V
C29
6.8
FROM A15J5-B3
FROM A13J3-A3
A3
B3
-6V
C31
6.8
FROM A15J5-B1
FROM A2A10J3-29
A1
14
-6V REF

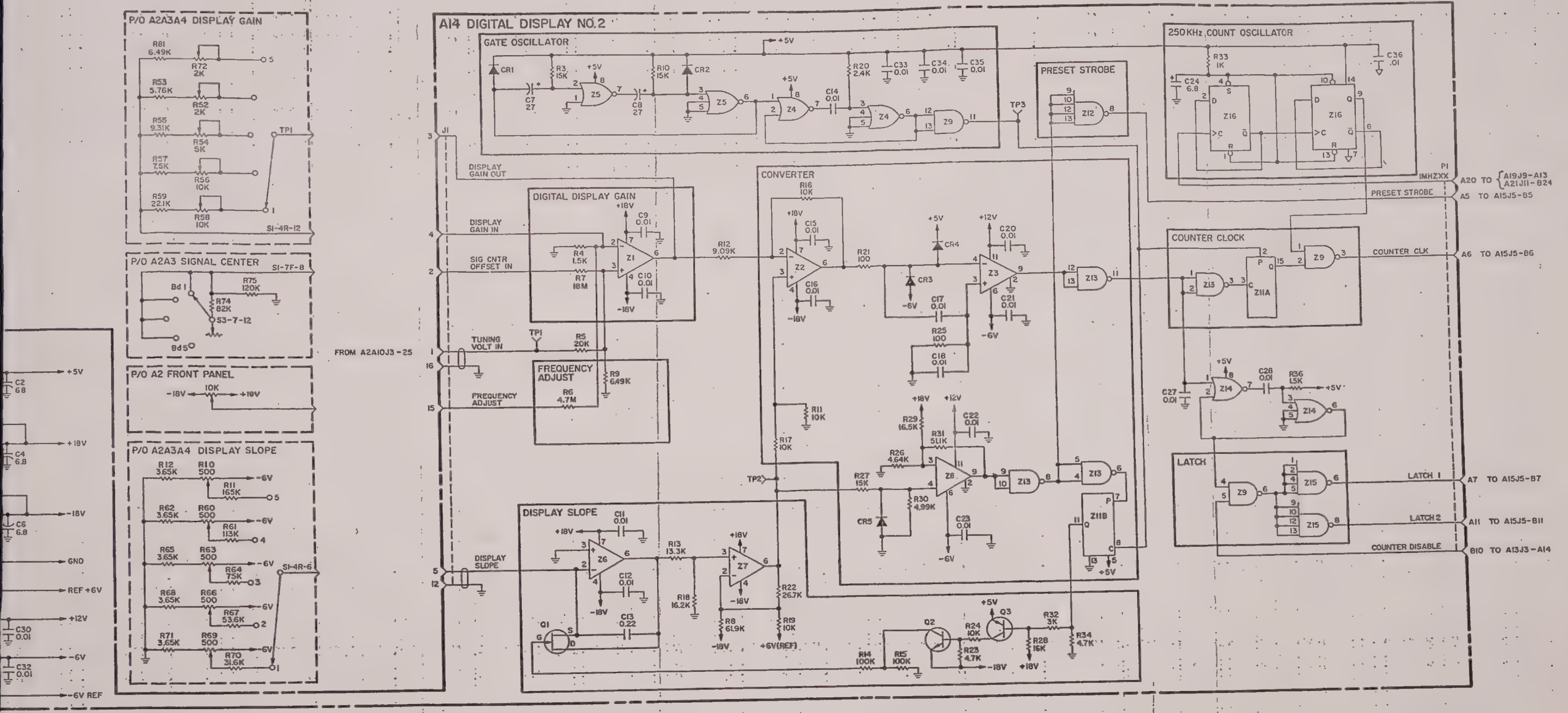
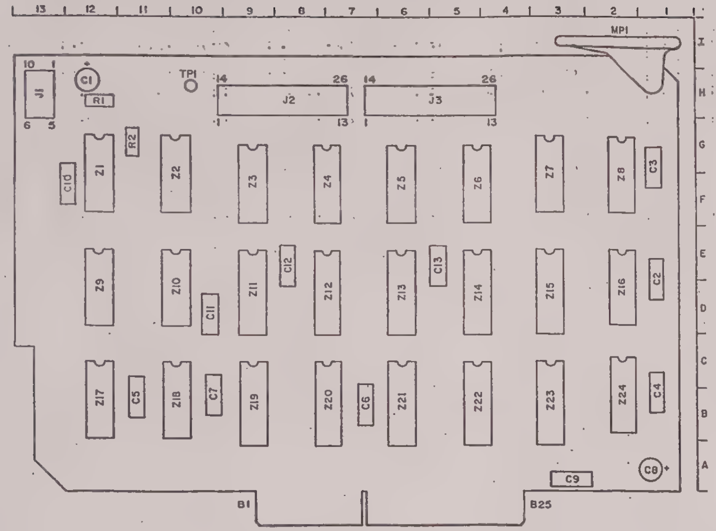

P/O A2A3A4 DISPLAY GAIN
R81 6.49K
R72 2K
R53 5.76K
R52 2K
R55 9.31K
R54 5K
R57 7.5K
R56 10K
R59 22.1K
R58 10K
TP1
S1-4R-12
P/O A2A3 SIGNAL CENTER
S1-7F-8
Bd 1
R75 120K
R74 82K
S3-7-12
Bd5
P/O A2 FRONT PANEL
10K
-18V
+18V
P/O A2A3A4 DISPLAY SLOPE
R12 3.65K
R10 500
R11 165K
R62 3.65K
R60 500
R61 113K
R65 3.65K
R63 500
R64 75K
R68 3.65K
R66 500
R67 53.6K
R71 3.65K
R69 500
R70 31.6K
S1-4R-6
C2 68
C4 6.8
C6 6.8
C30 0.01
C32 0.01
+5V
+18V
-18V
GND
REF +6V
+12V
-6V
-6V REF
FROM A2A10J3-25
A14 DIGITAL DISPLAY NO.2
J1
GATE OSCILLATOR
CR1
R3 15K
C7 27
Z5
C8 27
R10 15K
CR2
Z4
C14 0.01
R20 2.4K
C33 0.01
C34 0.01
C35 0.01
Z9
TP3
PRESET STROBE
Z12
250KHz COUNT OSCILLATOR
R33 1K
C24 6.8
C36 .01
Z16
DISPLAY GAIN OUT
DISPLAY GAIN IN
SIG CNTR OFFSET IN
DIGITAL DISPLAY GAIN
R4 1.5K
R7 18M
C9 0.01
C10 0.01
Z1
TUNING VOLT IN
TP1
R5 20K
FREQUENCY ADJUST
R6 4.7M
R9 649K
FREQUENCY ADJUST
CONVERTER
R16 10K
C15 0.01
R12 9.09K
Z2
C16 0.01
R21 100
CR4
C20 0.01
Z3
CR3
C17 0.01
C21 0.01
R25 100
C18 0.01
R11 10K
R17 10K
TP2
R29 16.5K
R31 51K
C22 0.01
R26 4.64K
R27 15K
Z8
R30 4.99K
CR5
C23 0.01
Z13
Z11B
DISPLAY SLOPE
C11 0.01
Z6
C12 0.01
R13 13.3K
Z7
R18 16.2K
R22 26.7K
R8 61.9K
R19 10K
+6V(REF)
C13 0.22
Q1
Q2
Q3
R14 100K
R15 100K
R24 10K
R23 4.7K
R32 3K
R28 15K
R34 4.7K
COUNTER CLOCK
Z11A
C27 0.01
Z14
C28 0.01
R36 1.5K
LATCH
Z15
P1
1MHZXX
A20 TO A19J9-A13 A21J11-B24
PRESET STROBE
A5 TO A15J5-B5
COUNTER CLK
A6 TO A15J5-B6
LATCH 1
A7 TO A15J5-B7
LATCH 2
A11 TO A15J5-B11
COUNTER DISABLE
B10 TO A13J3-A14

Figure 7-36. Digital Display Board No. 2 1A14, Maintenance Schematic Diagram

7-99/100 blank


13 12 11 10 9 8 7 6 5 4 3 2 1
I H G F E D C B A
MP1
J1
C1
R1
TP1
J2
J3
14 26 13
R2
C10
Z1 Z2 Z3 Z4 Z5 Z6 Z7 Z8 C3
Z9 Z10 C11 Z11 C12 Z12 Z13 C13 Z14 Z15 Z16 C2
Z17 C5 Z18 C7 Z19 Z20 C6 Z21 Z22 Z23 Z24 C4
C9 C8
B1 B25

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH

PARTS LOCATION INDEX, DIGITAL DISPLAY NO. 1 1A15

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	12H	MP1	2I	Z13	6D
C2	1E			Z14	5D
C3	1G	R1	12H	Z15	3D
C4	1C	R2	11G	Z16	2D
C5	11C			Z17	12B
C6	7B	Z1	12G	Z18	10B
C7	10C	Z2	10G	Z19	9B
C8	1A	Z3	9F	Z20	8B
C9	3A	Z4	8F	Z21	6B
C10	12F	Z5	6F	Z22	5B
C11	10D	Z6	5F	Z23	3B
C12	8E	Z7	3F	Z24	2B
C13	5E	Z8	2F		
		Z9	12D	TP1	10H
J1	13H	Z10	10D		
J2	8H	Z11	9D		
J3	5H	Z12	8D		

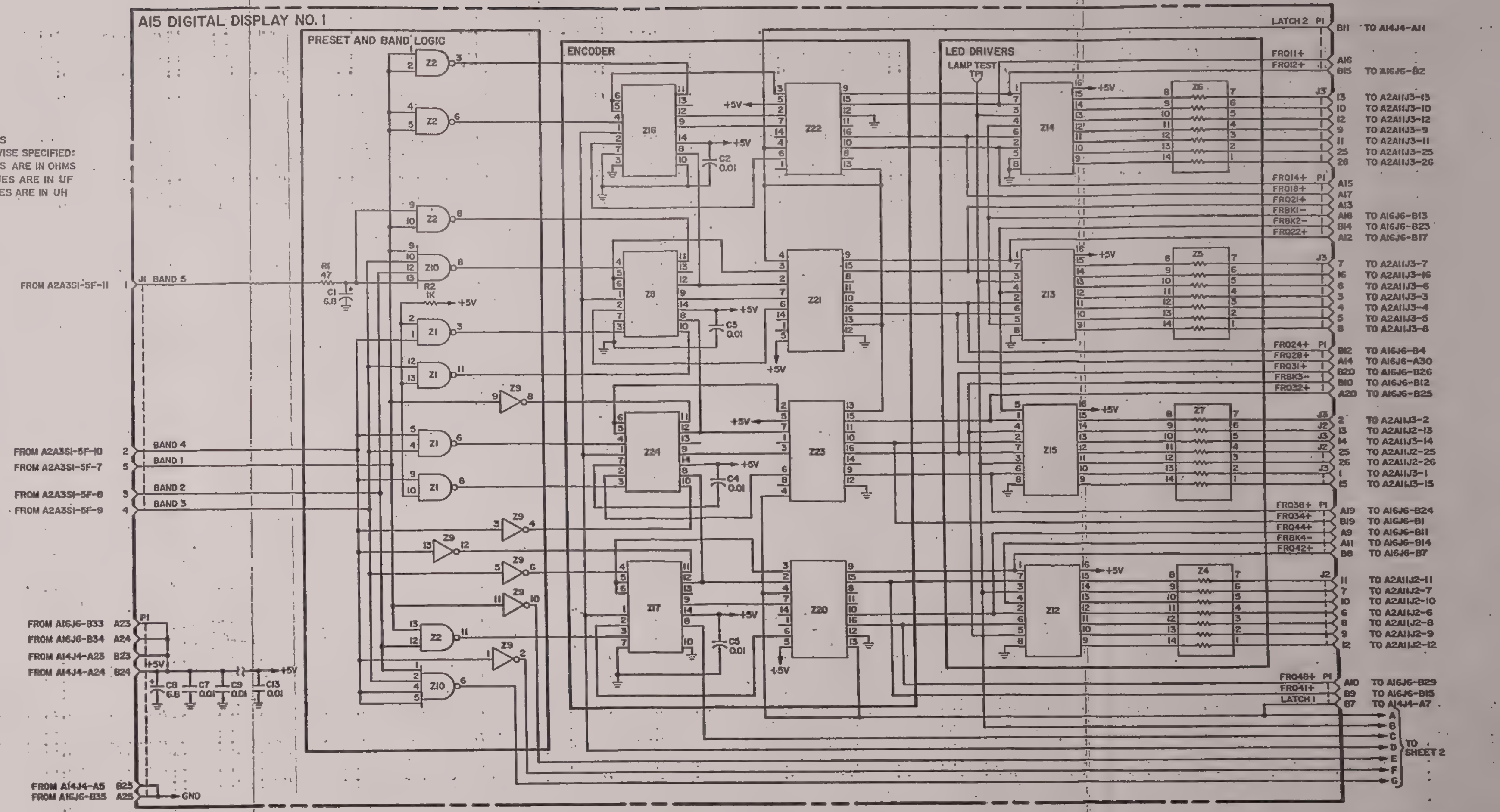

A15 DIGITAL DISPLAY NO. 1
PRESET AND BAND LOGIC
ENCODER
LED DRIVERS
LAMP TEST
TP1
FROM A2A3S1-5F-11
J1 BAND 5
FROM A2A3S1-5F-10
FROM A2A3S1-5F-7
FROM A2A3S1-5F-8
FROM A2A3S1-5F-9
BAND 4
BAND 1
BAND 2
BAND 3
R1 47
C1 6.8
R2 1K
+5V
FROM A16J6-B33 A23
FROM A16J6-B34 A24
FROM A14J4-A23 B23
FROM A14J4-A24 B24
P1
C8 6.8
C7 0.01
C9 0.01
C13 0.01
FROM A14J4-A5 B25
FROM A16J6-B35 A25
GND
Z1 Z2 Z9 Z10
Z16 Z22 Z8 Z21 Z24 Z23 Z17 Z20
C2 0.01
C3 0.01
C4 0.01
C5 0.01
Z14 Z13 Z15 Z12
Z6 Z5 Z7 Z4
LATCH 2 P1 B11 TO A14J4-A11
FRQ11+ FRQ12+ A16 B15 TO A16J5-B2
J3 13 10 12 9 11 25 26
TO A2A1J3-13
TO A2A1J3-10
TO A2A1J3-12
TO A2A1J3-9
TO A2A1J3-11
TO A2A1J3-25
TO A2A1J3-26
FRQ14+ FRQ18+ FRQ21+ FRBK1- FRBK2- FRQ22+
A15 A17 A13 A18 B14 A12
TO A16J6-B13
TO A16J6-B23
TO A16J6-B17
7 16 6 3 4 5 8
TO A2A1J3-7
TO A2A1J3-16
TO A2A1J3-6
TO A2A1J3-3
TO A2A1J3-4
TO A2A1J3-5
TO A2A1J3-8
FRQ24+ FRQ28+ FRQ31+ FRBK3- FRQ32+
B12 A14 B20 B10 A20
TO A16J6-B4
TO A16J6-A30
TO A16J6-B26
TO A16J6-B12
TO A16J6-B25
TO A2A1J3-2
TO A2A1J2-13
TO A2A1J3-14
TO A2A1J2-25
TO A2A1J2-26
TO A2A1J3-1
TO A2A1J3-15
FRQ38+ FRQ34+ FRQ44+ FRBK4- FRQ42+
A19 B19 A9 A11 B8
TO A16J6-B24
TO A16J6-B1
TO A16J6-B11
TO A16J6-B14
TO A16J6-B7
J2
TO A2A1J2-11
TO A2A1J2-7
TO A2A1J2-10
TO A2A1J2-6
TO A2A1J2-8
TO A2A1J2-9
TO A2A1J2-12
FRQ48+ FRQ41+ LATCH 1
A10 B9 B7
TO A16J6-B29
TO A16J6-B15
TO A14J4-A7
A B C D E F G
TO SHEET 2

Figure 7-37. Digital Display Printed Circuit Board No. 1 1A15, Maintenance Schematic Diagram (Sheet 1 of 2)

7-101/102 blank

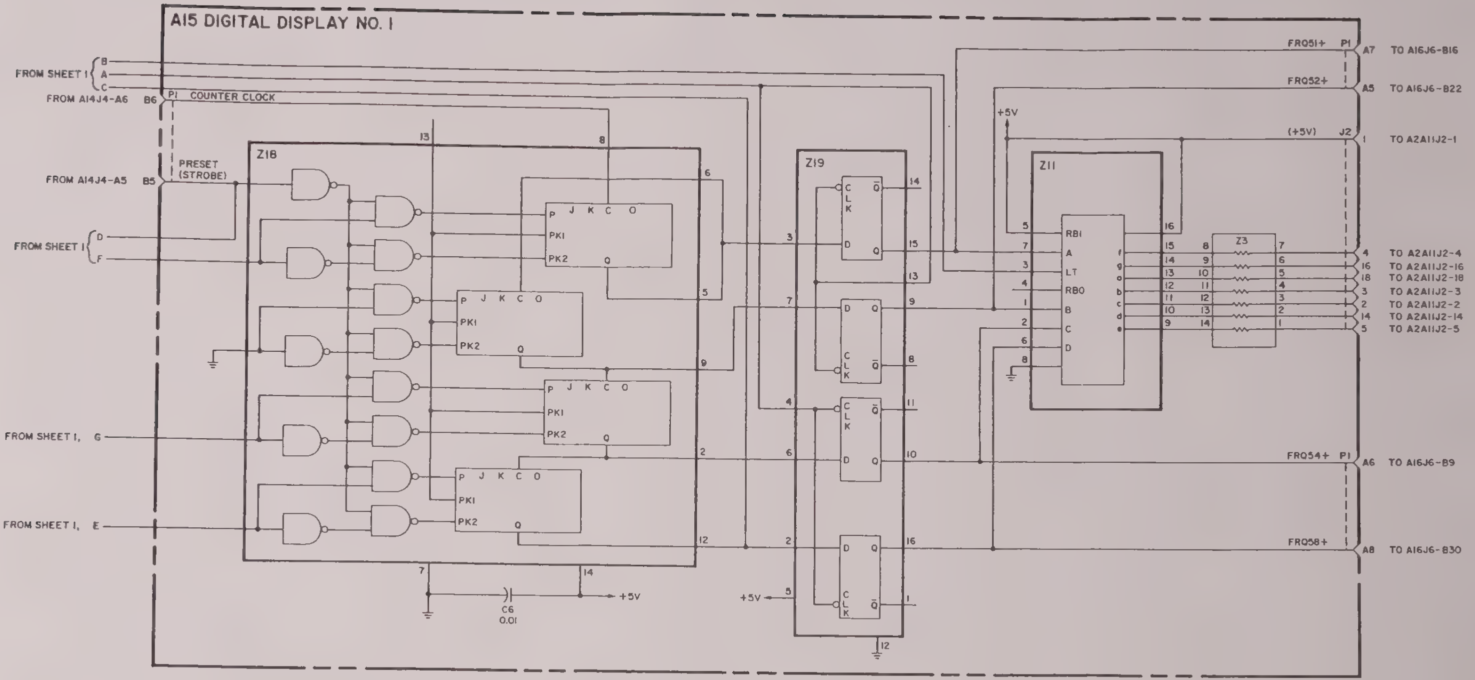
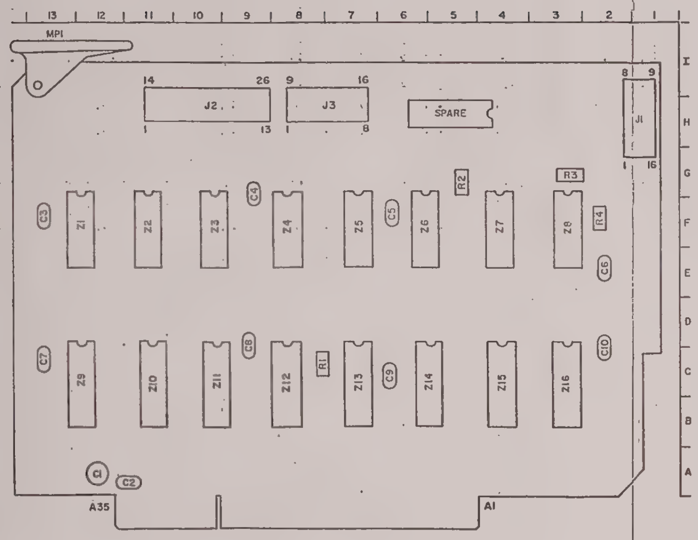

A15 DIGITAL DISPLAY NO. 1
FROM SHEET 1 B A C
FROM A14J4-A6 B6
P1 COUNTER CLOCK
FROM A14J4-A5 B5
PRESET (STROBE)
FROM SHEET 1 D F
FROM SHEET 1, G
FROM SHEET 1, E
Z18
P J K C O
PK1
PK2
Q
C6 0.01
+5V
Z19
CLK
D
Q
Q̄
Z11
RBI
A
LT
RBO
B
C
D
f g a b c d e
Z3
FRQ51+ P1 A7 TO A16J6-B16
FRQ52+ A5 TO A16J6-B22
(+5V) J2 1 TO A2A11J2-1
4 TO A2A11J2-4
16 TO A2A11J2-16
18 TO A2A11J2-18
3 TO A2A11J2-3
2 TO A2A11J2-2
14 TO A2A11J2-14
5 TO A2A11J2-5
FRQ54+ P1 A6 TO A16J6-B9
FRQ58+ A8 TO A16J6-B30

Figure 7-37. Digital Display Printed Circuit Board No. 1 1A15, Maintenance Schematic Diagram (Sheet 2 of 2)


13
12
11
10
9
8
7
6
5
4
3
2
1
I
H
G
F
E
D
C
B
A
MP1
J2
J3
SPARE
J1
14
26
9
16
1
13
8
R3
R2
R1
R4
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
Z1
Z2
Z3
Z4
Z5
Z6
Z7
Z8
Z9
Z10
Z11
Z12
Z13
Z14
Z15
Z16
A35
A1

PARTS LOCATION INDEX, FREQUENCY AND POWER REFERENCE ENCODER LOGIC NO. 1 1A16

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	12A	J3	7H	Z5	7F
C2	12A			Z6	6F
C3	13F	MP1	13I	Z7	4F
C4	9G			Z8	3F
C5	6F	R1	8C	Z9	12C
C6	2E	R2	5G	Z10	11C
C7	13C	R3	3G	Z11	10C
C8	9D	R4	2F	Z12	8C
C9	6C			Z13	7C
C10	2D	Z1	12F	Z14	6C
		Z2	11F	Z15	4C
J1	1H	Z3	10F	Z16	3C
J2	10H	Z4	8F		

NOTES.
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH

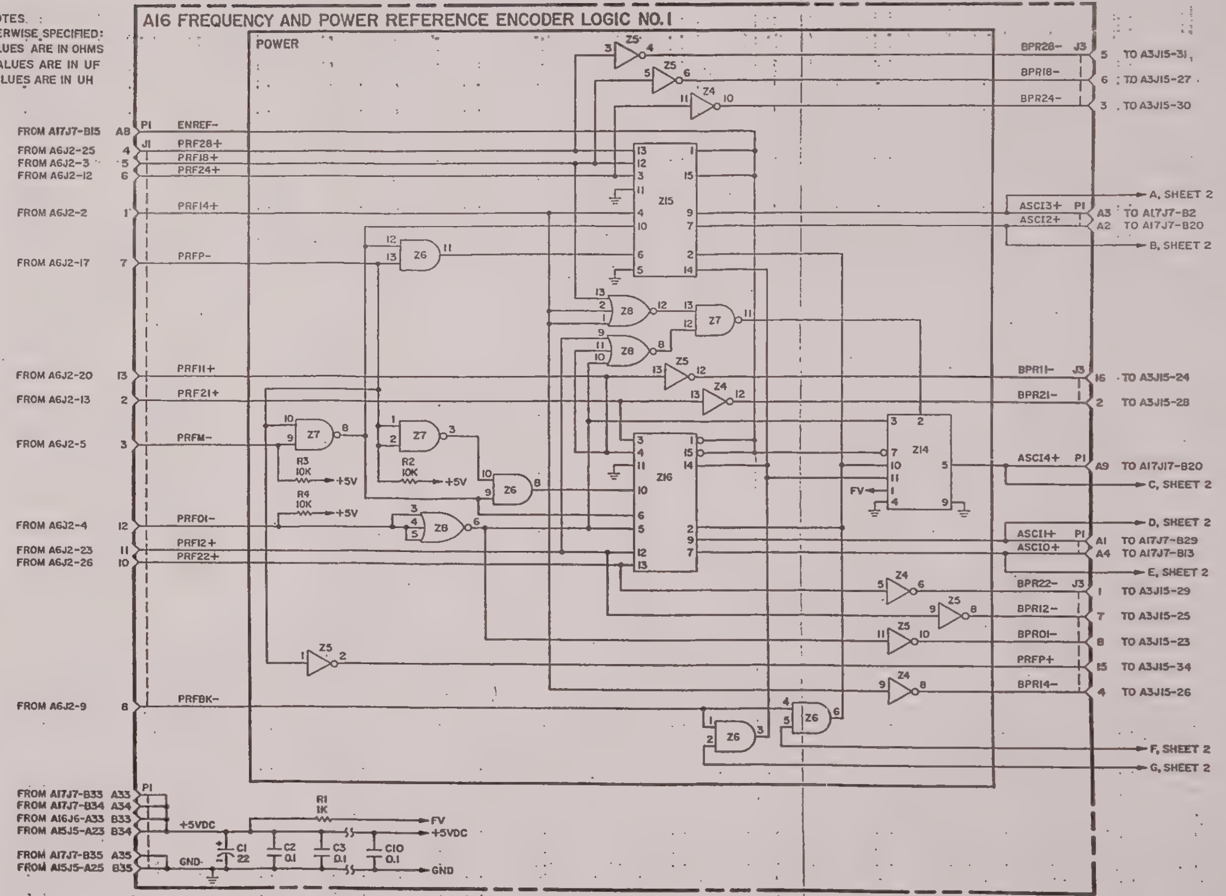

A16 FREQUENCY AND POWER REFERENCE ENCODER LOGIC NO. 1
POWER
FROM A17J7-B15
FROM A6J2-25
FROM A6J2-3
FROM A6J2-12
FROM A6J2-2
FROM A6J2-17
FROM A6J2-20
FROM A6J2-13
FROM A6J2-5
FROM A6J2-4
FROM A6J2-23
FROM A6J2-26
FROM A6J2-9
P1
J1
ENREF-
PRF28+
PRF18+
PRF24+
PRF14+
PRFP-
PRF11+
PRF21+
PRFM-
PRF01-
PRF12+
PRF22+
PRFBK-
Z15
Z16
Z14
Z4
Z5
Z6
Z7
Z8
R3 10K
R2 10K
R4 10K
+5V
FV
BPR28-
BPR18-
BPR24-
J3
TO A3J15-31
TO A3J15-27
TO A3J15-30
ASCI3+
ASCI2+
A3 TO A17J7-B2
A2 TO A17J7-B20
A, SHEET 2
B, SHEET 2
BPR11-
BPR21-
TO A3J15-24
TO A3J15-28
ASCI4+
A9 TO A17J7-B20
C, SHEET 2
D, SHEET 2
ASCI1+
ASCI0+
A1 TO A17J7-B29
A4 TO A17J7-B13
E, SHEET 2
BPR22-
BPR12-
BPR01-
PRFP+
BPR14-
TO A3J15-29
TO A3J15-25
TO A3J15-23
TO A3J15-34
TO A3J15-26
F, SHEET 2
G, SHEET 2
FROM A17J7-B33 A33
FROM A17J7-B34 A34
FROM A16J6-A33 B33
FROM A15J5-A23 B34
FROM A17J7-B35 A35
FROM A15J5-A25 B35
+5VDC
GND
R1 1K
C1 22
C2 0.1
C3 0.1
C10 0.1
FV
+5VDC
GND

Figure 7-38. Frequency and Power Reference Encoder Printed Circuit Board 1A16, Maintenance Schematic Diagram (Sheet 1 of 2)

7-105/106 blank

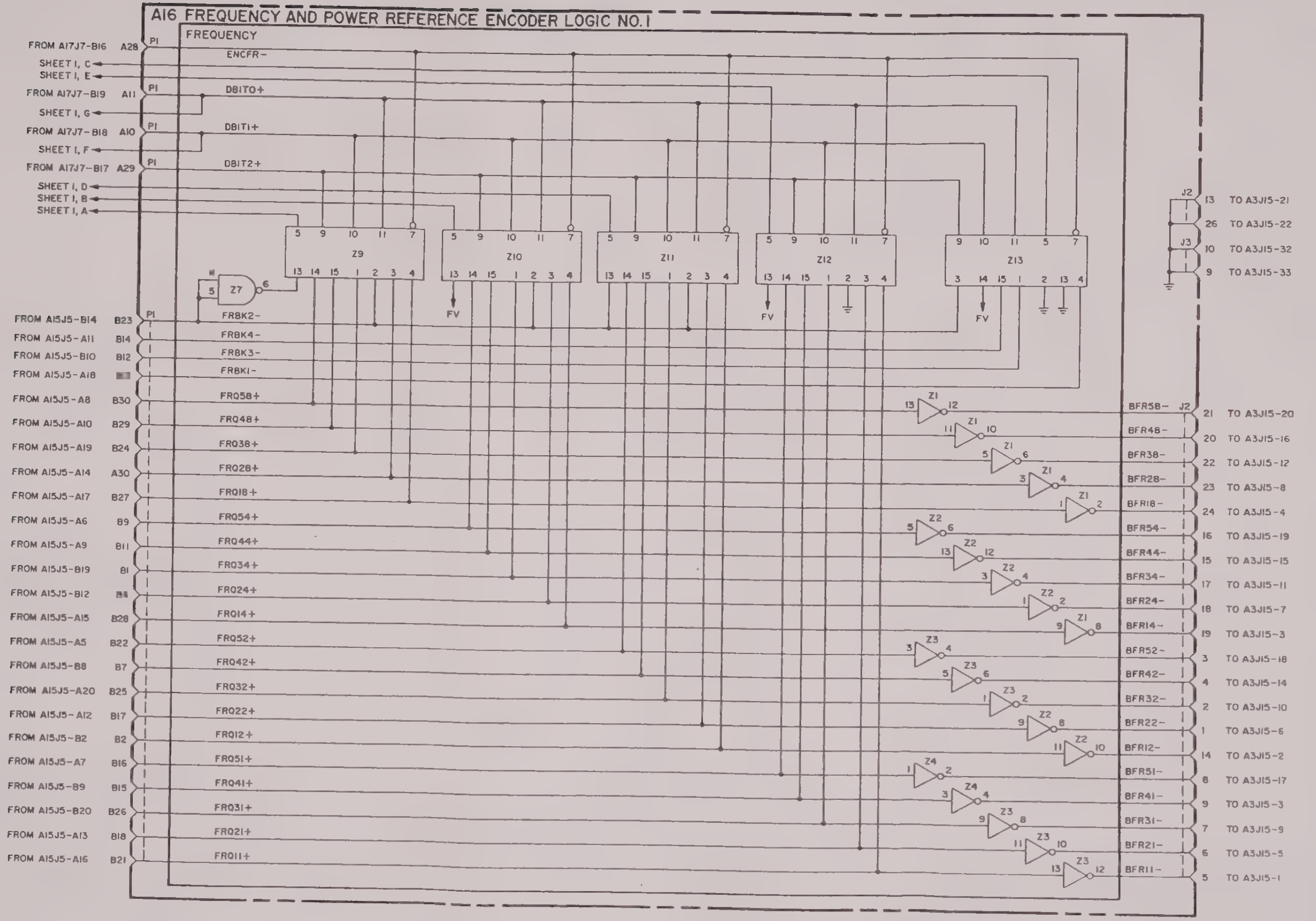
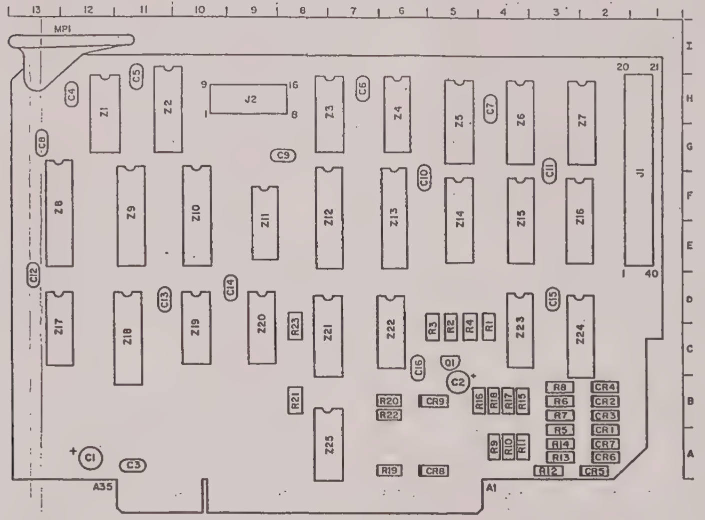

A16 FREQUENCY AND POWER REFERENCE ENCODER LOGIC NO. 1
FREQUENCY
FROM A17J7-B16 A28
SHEET 1, C
SHEET 1, E
FROM A17J7-B19 A11
SHEET 1, G
FROM A17J7-B18 A10
SHEET 1, F
FROM A17J7-B17 A29
SHEET 1, D
SHEET 1, B
SHEET 1, A
P1
ENCFR-
DBIT0+
DBIT1+
DBIT2+
Z9
Z10
Z11
Z12
Z13
Z7
FV
FROM A15J5-B14 B23
FROM A15J5-A11 B14
FROM A15J5-B10 B12
FROM A15J5-A18
FROM A15J5-A8 B30
FROM A15J5-A10 B29
FROM A15J5-A19 B24
FROM A15J5-A14 A30
FROM A15J5-A17 B27
FROM A15J5-A6 B9
FROM A15J5-A9 B11
FROM A15J5-B19 B1
FROM A15J5-B12
FROM A15J5-A15 B28
FROM A15J5-A5 B22
FROM A15J5-B8 B7
FROM A15J5-A20 B25
FROM A15J5-A12 B17
FROM A15J5-B2 B2
FROM A15J5-A7 B16
FROM A15J5-B9 B15
FROM A15J5-B20 B26
FROM A15J5-A13 B18
FROM A15J5-A16 B21
FRBK2-
FRBK4-
FRBK3-
FRBK1-
FRQ58+
FRQ48+
FRQ38+
FRQ28+
FRQ18+
FRQ54+
FRQ44+
FRQ34+
FRQ24+
FRQ14+
FRQ52+
FRQ42+
FRQ32+
FRQ22+
FRQ12+
FRQ51+
FRQ41+
FRQ31+
FRQ21+
FRQ11+
Z1
Z2
Z3
Z4
J2
J3
13 TO A3J15-21
26 TO A3J15-22
10 TO A3J15-32
9 TO A3J15-33
BFR58- 21 TO A3J15-20
BFR48- 20 TO A3J15-16
BFR38- 22 TO A3J15-12
BFR28- 23 TO A3J15-8
BFR18- 24 TO A3J15-4
BFR54- 16 TO A3J15-19
BFR44- 15 TO A3J15-15
BFR34- 17 TO A3J15-11
BFR24- 18 TO A3J15-7
BFR14- 19 TO A3J15-3
BFR52- 3 TO A3J15-18
BFR42- 4 TO A3J15-14
BFR32- 2 TO A3J15-10
BFR22- 1 TO A3J15-6
BFR12- 14 TO A3J15-2
BFR51- 8 TO A3J15-17
BFR41- 9 TO A3J15-3
BFR31- 7 TO A3J15-9
BFR21- 6 TO A3J15-5
BFR11- 5 TO A3J15-1

Figure 7-38. Frequency and Power Reference Encoder Printed Circuit Board 1A16, Maintenance Schematic Diagram (Sheet 2 of 2)

PARTS LOCATION INDEX, CHARACTER GENERATOR AND DATA ENCODER LOGIC NO. 2 1A17

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	12A	J1	1F	Z1	12H
C2	5B	J2	9H	Z2	11H
C3	11A	Q1	5C	Z3	8H
C4	12H			Z4	6H
C5	11H	R1	4C	Z5	5H
C6	7H	R2	5C	Z6	4H
C7	4H	R3	5C	Z7	3H
C8	13G	R4	5C	Z8	13F
C9	8G	R5	3A	Z9	11F
C10	6G	R6	3B	Z10	10F
C11	3G	R7	3B	Z11	9F
C12	13D	R8	3B	Z12	8F
C13	11D	R9	4A	Z13	6F
C14	10D	R10	4A	Z14	5F
C15	3D	R11	4A	Z15	4F
C16	6C	R12	3A	Z16	3F
		R13	3A	Z17	13C
		R14	3A	Z18	11C
CR1	2A	R15	4B	Z19	10C
CR2	2B	R16	5B	Z20	9C
CR3	2B	R17	4B	Z21	8C
CR4	2B	R18	4B	Z22	6C
CR5	2A	R19	6A	Z23	4C
CR6	2A	R20	6B	Z24	3C
CR7	2A	R21	8B	Z25	7B
CR8	5A	R22	6B		
CR9	5B	R23	8D		


13 12 11 10 9 8 7 6 5 4 3 2 1
H G F E D C B A
MP1
J1
J2
Z1 Z2 Z3 Z4 Z5 Z6 Z7
Z8 Z9 Z10 Z11 Z12 Z13 Z14 Z15 Z16
Z17 Z18 Z19 Z20 Z21 Z22 Z23 Z24 Z25
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16
Q1
R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R17 R18 R19 R20 R21 R22 R23
CR1 CR2 CR3 CR4 CR5 CR6 CR7 CR8 CR9
20 21
1 40
A35
A1

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH

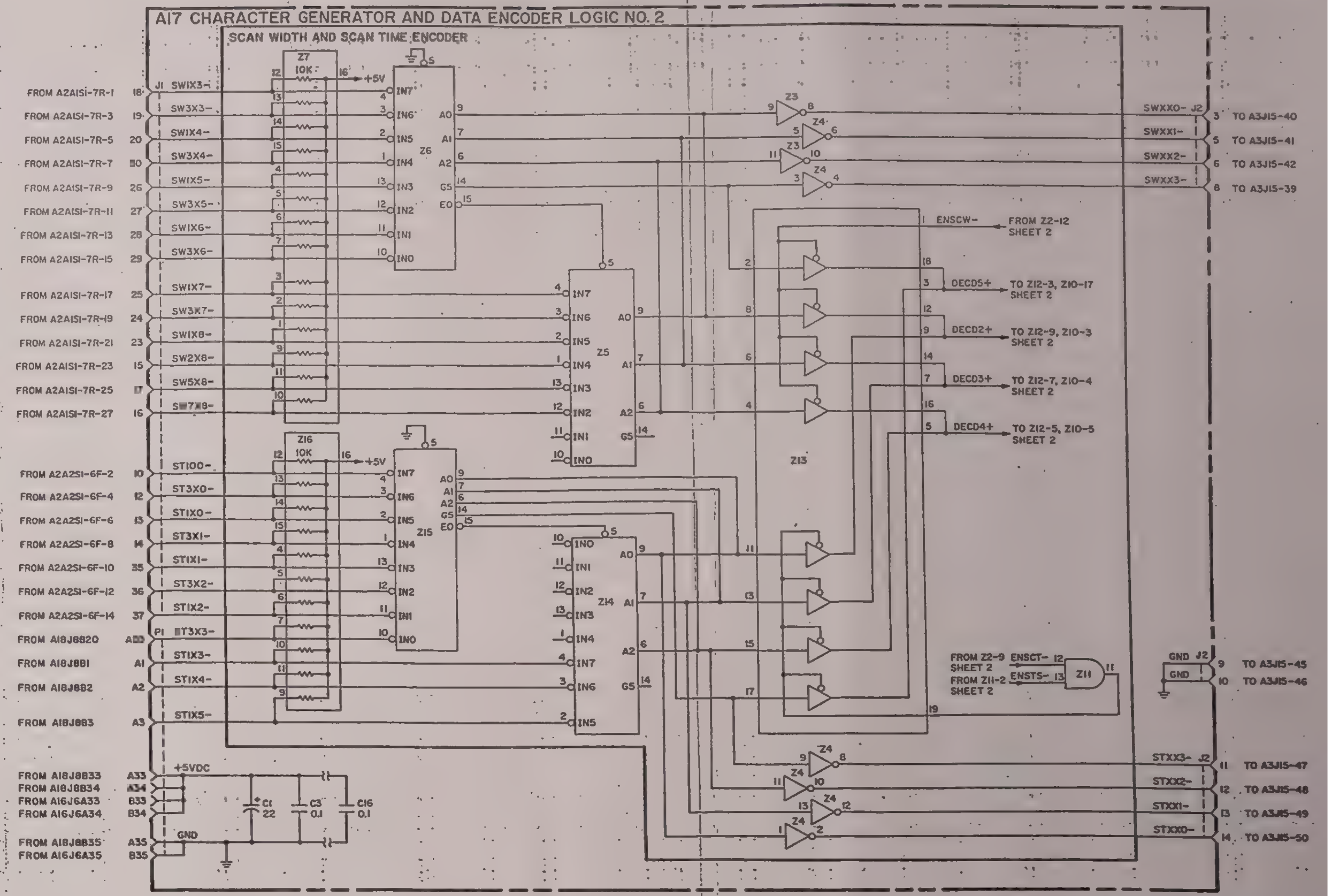

A17 CHARACTER GENERATOR AND DATA ENCODER LOGIC NO. 2
SCAN WIDTH AND SCAN TIME ENCODER
FROM A2A1S1-7R-1
FROM A2A1S1-7R-3
FROM A2A1S1-7R-5
FROM A2A1S1-7R-7
FROM A2A1S1-7R-9
FROM A2A1S1-7R-11
FROM A2A1S1-7R-13
FROM A2A1S1-7R-15
FROM A2A1S1-7R-17
FROM A2A1S1-7R-19
FROM A2A1S1-7R-21
FROM A2A1S1-7R-23
FROM A2A1S1-7R-25
FROM A2A1S1-7R-27
FROM A2A2S1-6F-2
FROM A2A2S1-6F-4
FROM A2A2S1-6F-6
FROM A2A2S1-6F-8
FROM A2A2S1-6F-10
FROM A2A2S1-6F-12
FROM A2A2S1-6F-14
FROM A18J8B20
FROM A18J8B1
FROM A18J8B2
FROM A18J8B3
FROM A18J8B33
FROM A18J8B34
FROM A16J6A33
FROM A16J6A34
FROM A18J8B35
FROM A16J6A35
J1
P1
SW1X3-
SW3X3-
SW1X4-
SW3X4-
SW1X5-
SW3X5-
SW1X6-
SW3X6-
SW1X7-
SW3X7-
SW1X8-
SW2X8-
SW5X8-
SW7X8-
ST100-
ST3X0-
ST1X0-
ST3X1-
ST1X1-
ST3X2-
ST1X2-
ST3X3-
ST1X3-
ST1X4-
ST1X5-
Z7 10K
Z16 10K
+5V
Z6
Z5
Z15
Z14
Z13
Z3
Z4
Z11
IN7 IN6 IN5 IN4 IN3 IN2 IN1 IN0
A0 A1 A2 GS EO
ENSCW-
FROM Z2-12 SHEET 2
DECD5+
TO Z12-3, Z10-17 SHEET 2
DECD2+
TO Z12-9, Z10-3 SHEET 2
DECD3+
TO Z12-7, Z10-4 SHEET 2
DECD4+
TO Z12-5, Z10-5 SHEET 2
FROM Z2-9 SHEET 2
ENSCT-
FROM Z11-2 SHEET 2
ENSTS-
SWXX0- J2
SWXX1-
SWXX2-
SWXX3-
TO A3J15-40
TO A3J15-41
TO A3J15-42
TO A3J15-39
GND J2
GND
TO A3J15-45
TO A3J15-46
STXX3- J2
STXX2-
STXX1-
STXX0-
TO A3J15-47
TO A3J15-48
TO A3J15-49
TO A3J15-50
+5VDC
C1 22
C3 0.1
C16 0.1
GND

Figure 7-39. Character Generator and Data Encoder Printed Circuit Board 1A17, Maintenance Schematic Diagram (Sheet 1 of 2)

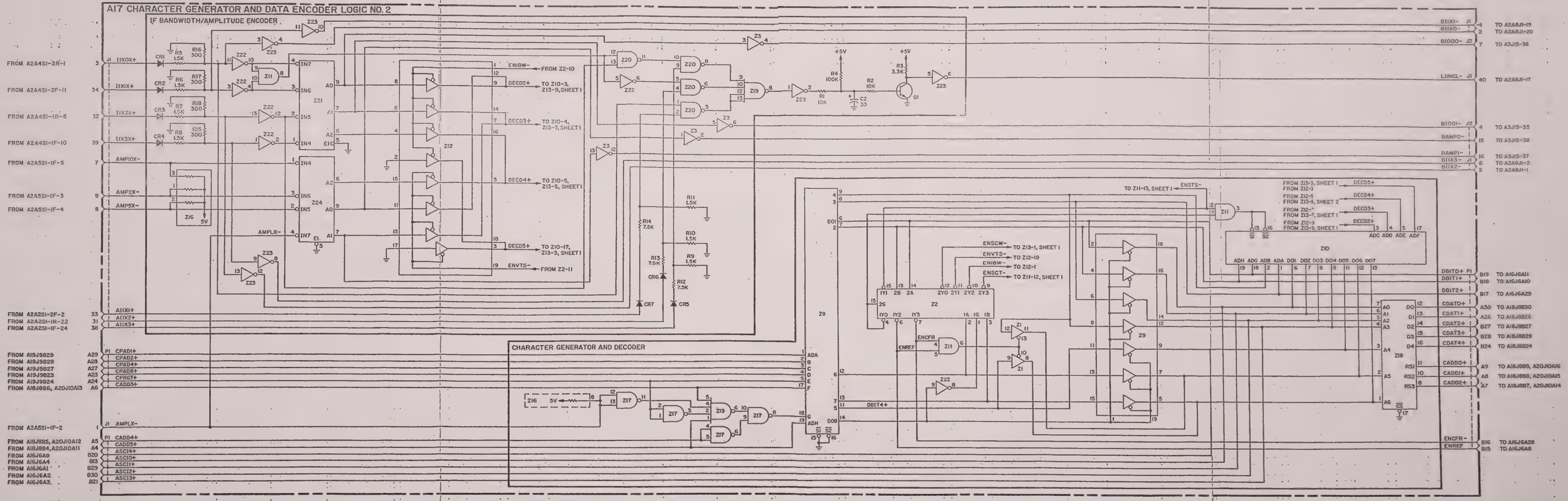
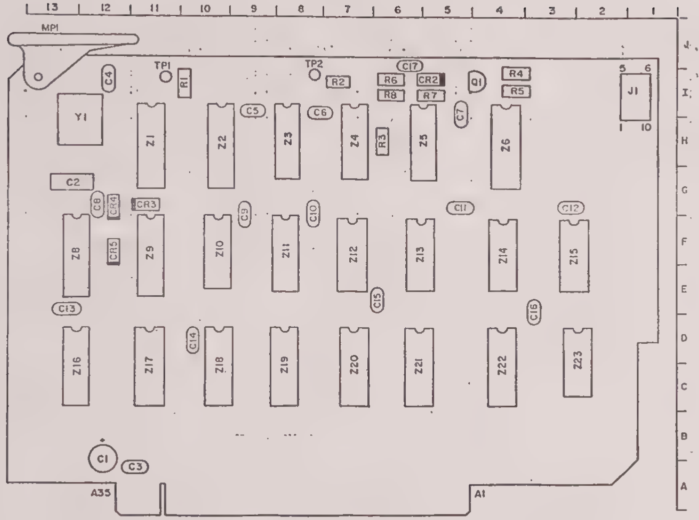

A17 CHARACTER GENERATOR AND DATA ENCODER LOGIC NO. 2
IF BANDWIDTH/AMPLITUDE ENCODER
CHARACTER GENERATOR AND DECODER
FROM A2A4S1-2R-1
FROM A2A4S1-2F-11
FROM A2A4S1-1R-6
FROM A2A4S1-1F-10
FROM A2A5S1-1F-5
FROM A2A5S1-1F-3
FROM A2A5S1-1F-4
I1X0X+
I1X1X+
I1X2X+
I1X3X+
AMP10X-
AMP2X-
AMP5X-
AMPLX-
FROM A2A2S1-2F-2
FROM A2A2S1-1R-22
FROM A2A2S1-1F-24
A11X1+
A11X2+
A11X3+
FROM A19J9B29
FROM A19J9B28
FROM A19J9B27
FROM A19J9B23
FROM A19J9B24
FROM A18J8B6, A20J10A13
CPAD1+
CPAD2+
CPAD4+
CPAD8+
CPRGT+
CADD3+
FROM A2A5S1-1F-2
FROM A18J8B5, A20J10A12
FROM A18J8B4, A20J10A11
FROM A16J6A9
FROM A16J6A4
FROM A16J6A1
FROM A16J6A2
FROM A16J6A3
CADD4+
CADD5+
ASCI4+
ASCI0+
ASCI1+
ASCI2+
ASCI3+
ENIBW- FROM Z2-10
DECD2+ TO Z10-3, Z13-9, SHEET 1
DECD3+ TO Z10-4, Z13-7, SHEET 1
DECD4+ TO Z10-5, Z13-5, SHEET 1
DECD5+ TO Z10-17, Z13-3, SHEET 1
ENVTS- FROM Z2-11
ENSCW- TO Z13-1, SHEET 1
ENVTS- TO Z12-19
ENIBW- TO Z12-1
ENSCT- TO Z11-12, SHEET 1
TO Z11-13, SHEET 1 ENSTS-
FROM Z13-3, SHEET 1 FROM Z12-3 DECD5+
FROM Z12-5 FROM Z13-5, SHEET 2 DECD4+
FROM Z12-7 FROM Z13-7, SHEET 1 DECD3+
FROM Z12-9 FROM Z13-9, SHEET 1 DECD2+
DBIT4+
ENCFR
ENREF
B11X1- TO A2A8J1-19
B11X0- TO A2A8J1-20
B1000- TO A3J15-36
LUNCL- TO A2A8J1-17
B1001- TO A3J15-35
BAMP0- TO A3J15-38
BAMP1- TO A3J15-37
B11X3- TO A2A8J1-2
B11X2- TO A2A8J1-1
DBIT0+ TO A16J6A11
DBIT1+ TO A16J6A10
DBIT2+ TO A16J6A29
CDAT0+ TO A18J8B30
CDAT1+ TO A18J8B26
CDAT2+ TO A18J8B27
CDAT3+ TO A18J8B28
CDAT4+ TO A18J8B24
CADD0+ TO A18J8B9, A20J10A16
CADD1+ TO A18J8B8, A20J10A15
CADD2+ TO A18J8B7, A20J10A14
ENCFR- TO A16J6A28
ENREF TO A16J6A8
Z2
Z8
Z9
Z10
Z11
Z12
Z16
Z17
Z18
Z19
Z20
Z21
Z22
Z23
Z24
+5V
Q1

Figure 7-39. Character Generator and Data Encoder Printed Circuit Board 1A17, Maintenance Schematic Diagram (Sheet 2 of 2)

7-111/112 blank


13 12 11 10 9 8 7 6 5 4 3 2 1
J I H G F E D C B A
MP1
TP1
TP2
Y1
J1
R1 R2 R3 R4 R5 R6 R7 R8
CR1 CR2 CR3 CR4 CR5
Q1
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17
Z1 Z2 Z3 Z4 Z5 Z6 Z8 Z9 Z10 Z11 Z12 Z13 Z14 Z15 Z16 Z17 Z18 Z19 Z20 Z21 Z22 Z23
A35
A1

PARTS LOCATION INDEX, HORIZONTAL TIMING LOGIC NO. 3 1A18

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	12B	J1	1I	Z3	8H
C2	13G			Z4	7H
C3	12B	MP1	13I	Z5	5H
C4	12I			Z6	4H
C5	9I	Q1	4H	Z7	NOT USED
C6	8I			Z8	12F
C7	5I	R1	10I	Z9	11F
C8	12G	R2	7I	Z10	10F
C9	9G	R3	6H	Z11	8F
C10	8G	R4	4I	Z12	7F
C11	5G	R5	4I	Z13	6F
C12	3G	R6	6I	Z14	4F
C13	13E	R7	5I	Z15	2F
C14	10D	R8	6I	Z16	13C
C15	7E			Z17	11C
C16	3E	TP1	11J	Z18	10C
C17	6I	TP2	8J	Z19	8C
				Z20	7C
CR1	6I			Z21	6C
CR2	5I	Y1	12H	Z22	4C
CR3	11G			Z23	2C
CR4	12G	Z1	11H		
CR5	12F	Z2	10H		

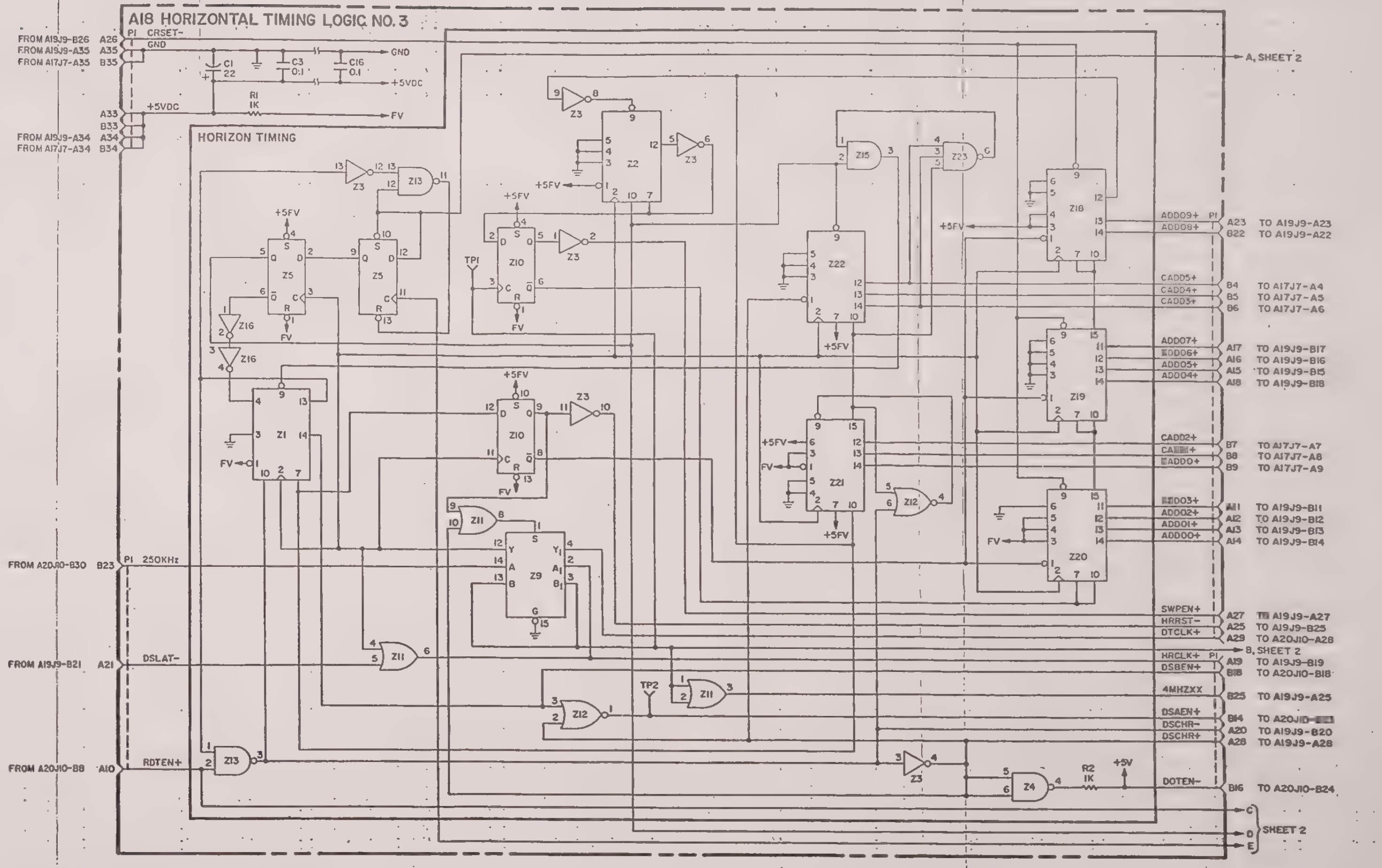

A18 HORIZONTAL TIMING LOGIC NO. 3
FROM A19J9-B26
FROM A19J9-A35
FROM A17J7-A35
FROM A19J9-A34
FROM A17J7-A34
HORIZON TIMING
+5VDC
GND
+5VDC
FV
+5FV
A, SHEET 2
FROM A20J10-B30
250KHz
FROM A19J9-B21
DSLAT-
FROM A20J10-B8
RDTEN+
TP1
TP2
ADD09+
ADD08+
CADD5+
CADD4+
CADD3+
ADD07+
ADD06+
ADD05+
ADD04+
CADD2+
CADD1+
CADD0+
ADD03+
ADD02+
ADD01+
ADD00+
SWPEN+
HRRST-
DTCLK+
HRCLK+
DSBEN+
4MHZXX
DSAEN+
DSCHR-
DSCHR+
DOTEN-
TO A19J9-A23
TO A19J9-A22
TO A17J7-A4
TO A17J7-A5
TO A17J7-A6
TO A19J9-B17
TO A19J9-B16
TO A19J9-B15
TO A19J9-B18
TO A17J7-A7
TO A17J7-A8
TO A17J7-A9
TO A19J9-B11
TO A19J9-B12
TO A19J9-B13
TO A19J9-B14
TO A19J9-A27
TO A19J9-B25
TO A20J10-A28
B, SHEET 2
TO A19J9-B19
TO A20J10-B18
TO A19J9-A25
TO A19J9-B20
TO A19J9-A28
TO A20J10-B24
C D E SHEET 2
R1 1K
R2 1K
C1 22
C3 0.1
C16 0.1
Z1 Z2 Z3 Z4 Z5 Z9 Z10 Z11 Z12 Z13 Z15 Z16 Z18 Z19 Z20 Z21 Z22 Z23

Figure 7-40. Horizontal Timing Printed Circuit Board 1A18, Maintenance Schematic Diagram (Sheet 1 of 2)

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH

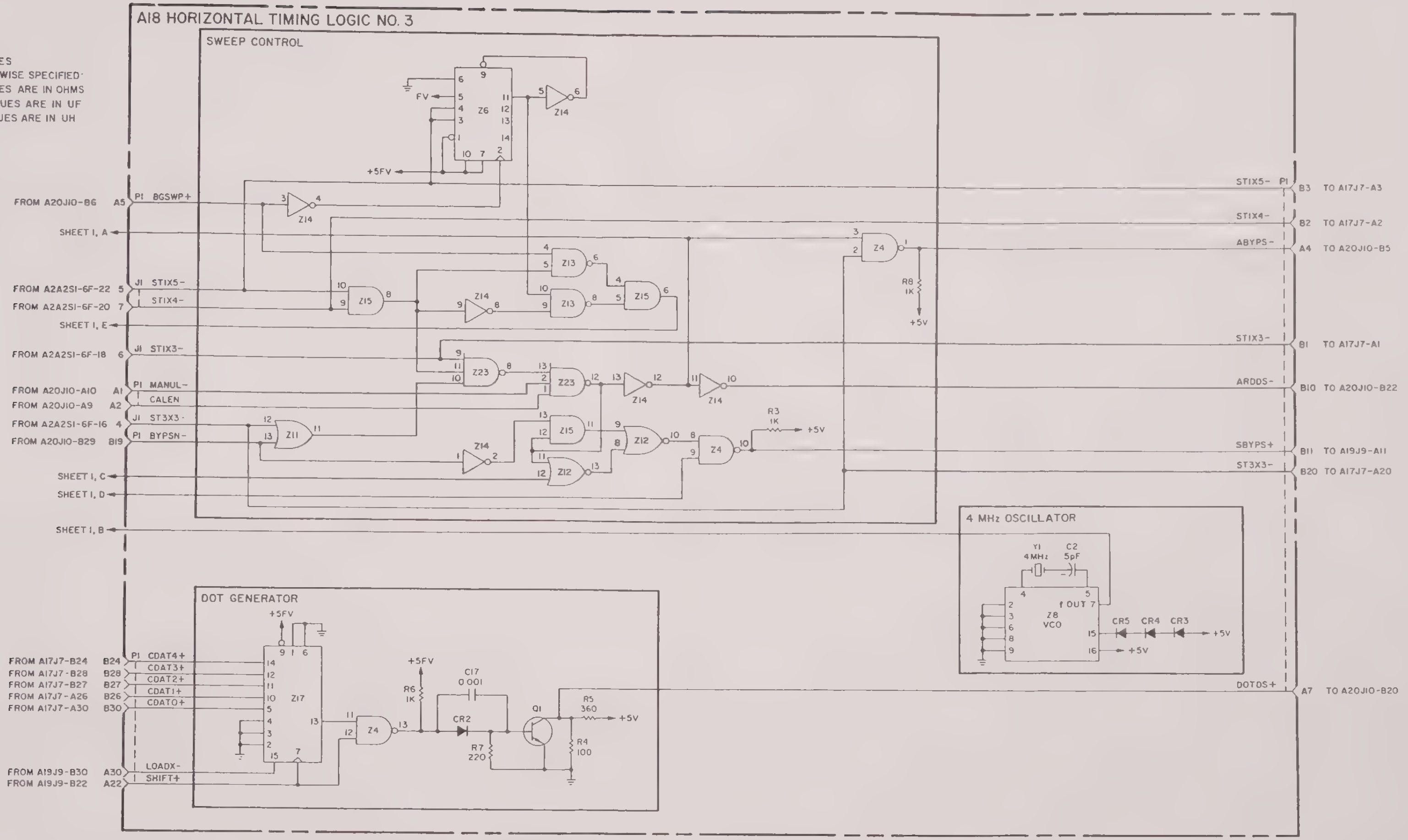
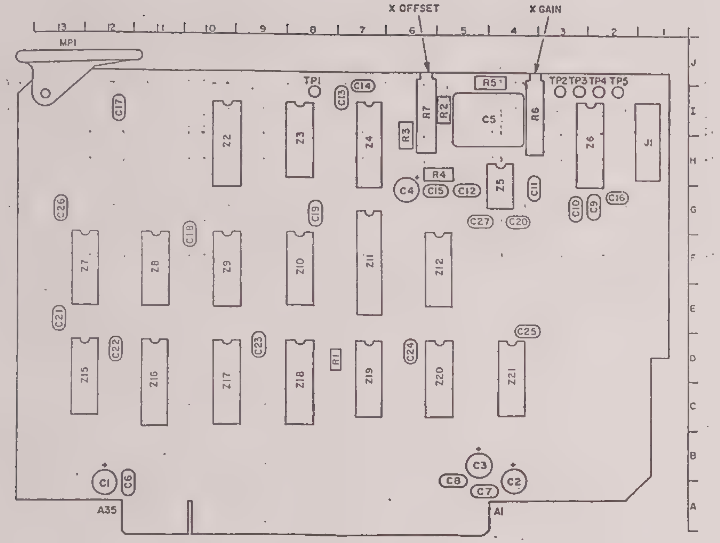

A18 HORIZONTAL TIMING LOGIC NO. 3
SWEEP CONTROL
Z6
FV
+5FV
Z14
Z13
Z15
Z23
Z11
Z12
Z4
R8 1K
+5V
R3 1K
FROM A20J10-B6 A5 P1 BGSWP+
SHEET 1, A
FROM A2A2S1-6F-22 5 J1 STIX5-
FROM A2A2S1-6F-20 7 STIX4-
SHEET 1, E
FROM A2A2S1-6F-18 6 J1 STIX3-
FROM A20J10-A10 A1 P1 MANUL-
FROM A20J10-A9 A2 CALEN
FROM A2A2S1-6F-16 4 J1 ST3X3-
FROM A20J10-B29 B19 P1 BYPSN-
SHEET 1, C
SHEET 1, D
SHEET 1, B
STIX5- P1 B3 TO A17J7-A3
STIX4- B2 TO A17J7-A2
ABYPS- A4 TO A20J10-B5
STIX3- B1 TO A17J7-A1
ARDDS- B10 TO A20J10-B22
SBYPS+ B11 TO A19J9-A11
ST3X3- B20 TO A17J7-A20
4 MHz OSCILLATOR
Y1 4MHz
C2 5pF
Z8 VCO
f OUT
CR5
CR4
CR3
+5V
DOTOS+ A7 TO A20J10-B20
DOT GENERATOR
+5FV
Z17
FROM A17J7-B24 B24 P1 CDAT4+
FROM A17J7-B28 B28 CDAT3+
FROM A17J7-B27 B27 CDAT2+
FROM A17J7-A26 B26 CDAT1+
FROM A17J7-A30 B30 CDAT0+
FROM A19J9-B30 A30 LOADX-
FROM A19J9-B22 A22 SHIFT+
R6 1K
C17 0.001
CR2
R7 220
Q1
R5 360
R4 100
+5V

Figure 7-40. Horizontal Timing Printed Circuit Board 1A18, Maintenance Schematic Diagram (Sheet 2 of 2)


X OFFSET
X GAIN
MP1
TP1
TP2 TP3 TP4 TP5
C1 C2 C3 C4 C5 C6 C7 C8 C10 C11 C12 C13 C14 C15 C16 C17 C19 C20 C21 C22 C23 C24 C25 C26 C27
R1 R2 R3 R4 R5 R6 R7
Z2 Z3 Z4 Z5 Z6 Z7 Z8 Z9 Z10 Z11 Z12 Z15 Z16 Z17 Z18 Z19 Z20 Z21
J1
A35
A1
13 12 11 10 9 8 7 6 5 4 3 2 1
J I H G F E D C B A

PARTS LOCATION INDEX, DISPLAY AND HORIZONTAL OUTPUT LOGIC NO. 4 1A19

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	12A	C23	9D	Z1	NOT USED
C2	4A	C24	6D	Z2	10H
C3	5B	C25	4E	Z3	8H
C4	6H	C26	13G	Z4	7H
C5	5I	C27	5G	Z5	4H
C6	12A			Z6	2H
C7	5A	J1	1I	Z7	12F
C8	5B	MP1	13J	Z8	11F
C9	2G			Z9	10F
C10	3G	R1	8D	Z10	8F
C11	4H	R2	5I	Z11	7F
C12	5H	R3	6I	Z12	5F
C13	7I	R4	5H	Z13	NOT USED
C14	7I	R5	4I	Z14	NOT USED
C15	6H	R6	4I	Z15	12D
C16	2G	R7	6I	Z16	11D
C17	12I			Z17	10D
C18	10F	TP1	8J	Z18	8D
C19	8G	TP2	3J	Z19	7D
C20	4G	TP3	3J	Z20	6D
C21	13E	TP4	2J	Z21	4D
C22	12D	TP5	2J		

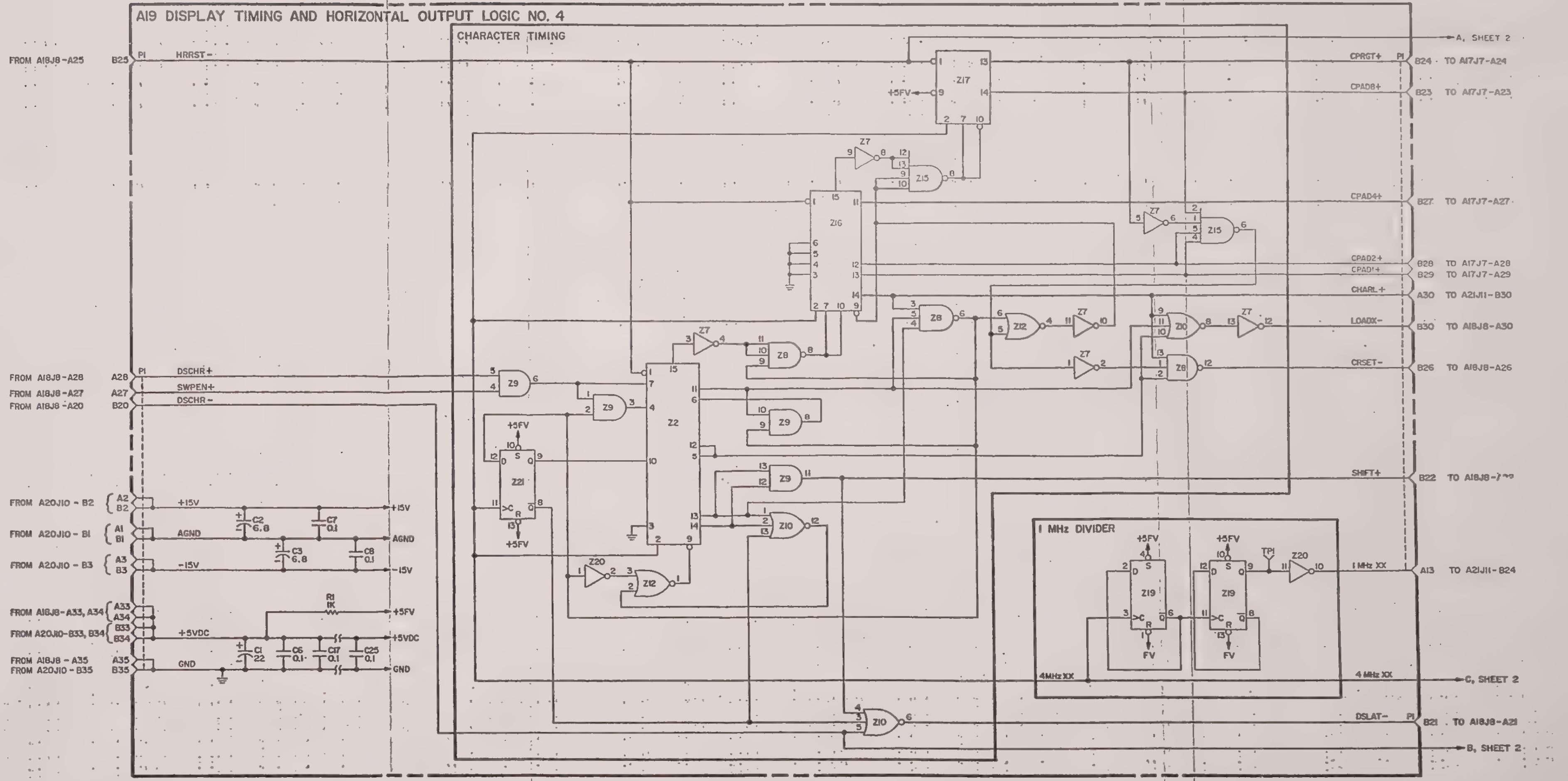

A19 DISPLAY TIMING AND HORIZONTAL OUTPUT LOGIC NO. 4
CHARACTER TIMING
1 MHz DIVIDER
FROM A18J8-A25
B25
P1
HRRST-
FROM A18J8-A28
FROM A18J8-A27
FROM A18J8-A20
A28
A27
B20
DSCHR+
SWPEN+
DSCHR-
FROM A20J10-B2
FROM A20J10-B1
FROM A20J10-B3
FROM A18J8-A33, A34
FROM A20J10-B33, B34
FROM A18J8-A35
FROM A20J10-B35
+15V
AGND
-15V
+5VDC
GND
+5FV
C23 6.8
C7 0.1
C3 6.8
C8 0.1
R1 1K
C1 22
C6 0.1
C17 0.1
C25 0.1
Z2 Z7 Z8 Z9 Z10 Z12 Z15 Z16 Z17 Z19 Z20 Z21
TP1
A, SHEET 2
CPRGT+
CPAD8+
CPAD4+
CPAD2+
CPAD1+
CHARL+
LOADX-
CRSET-
SHIFT+
1 MHz XX
4 MHz XX
DSLAT-
B24 TO A17J7-A24
B23 TO A17J7-A23
B27 TO A17J7-A27
B28 TO A17J7-A28
B29 TO A17J7-A29
A30 TO A21J11-B30
B30 TO A18J8-A30
B26 TO A18J8-A26
B22 TO A18J8-
A13 TO A21J11-B24
C, SHEET 2
B21 TO A18J8-A21
B, SHEET 2

Figure 7-41. Display Timing and Horizontal Output Printed Circuit Board 1A19, Maintenance Schematic Diagram (Sheet 1 of 2)

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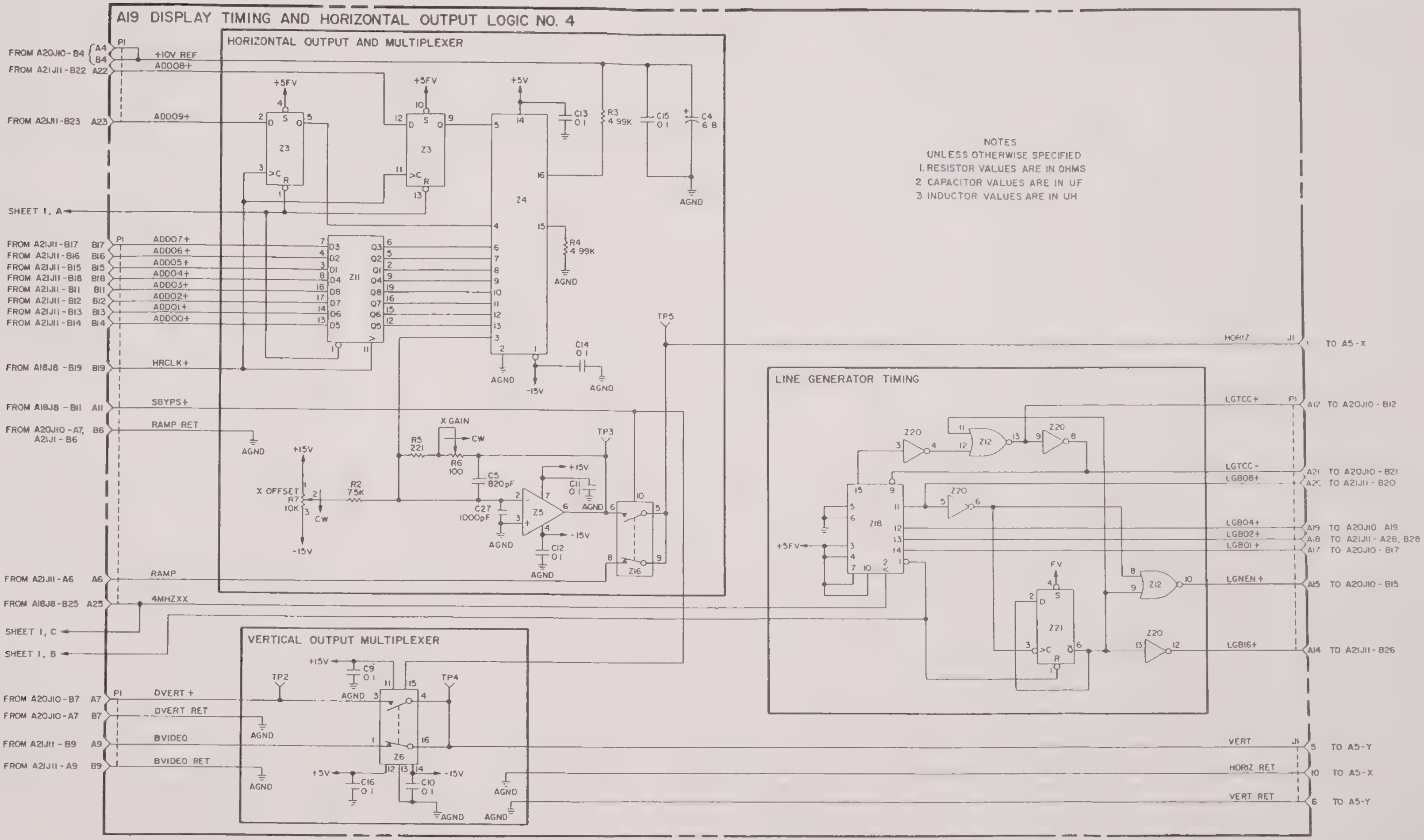
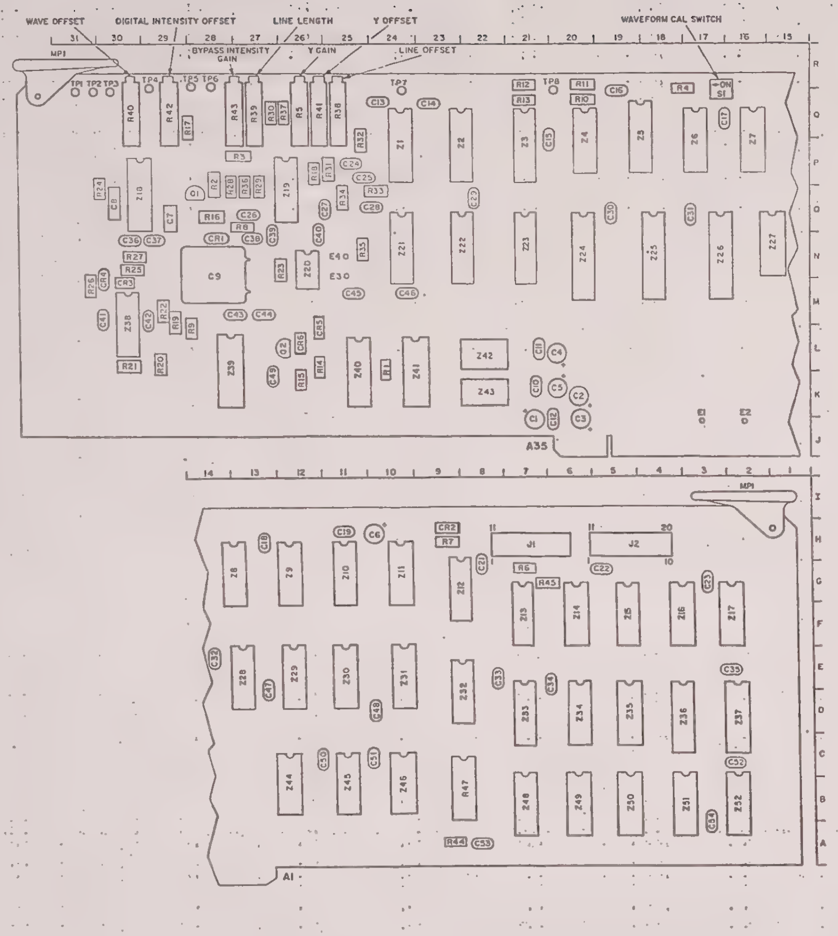
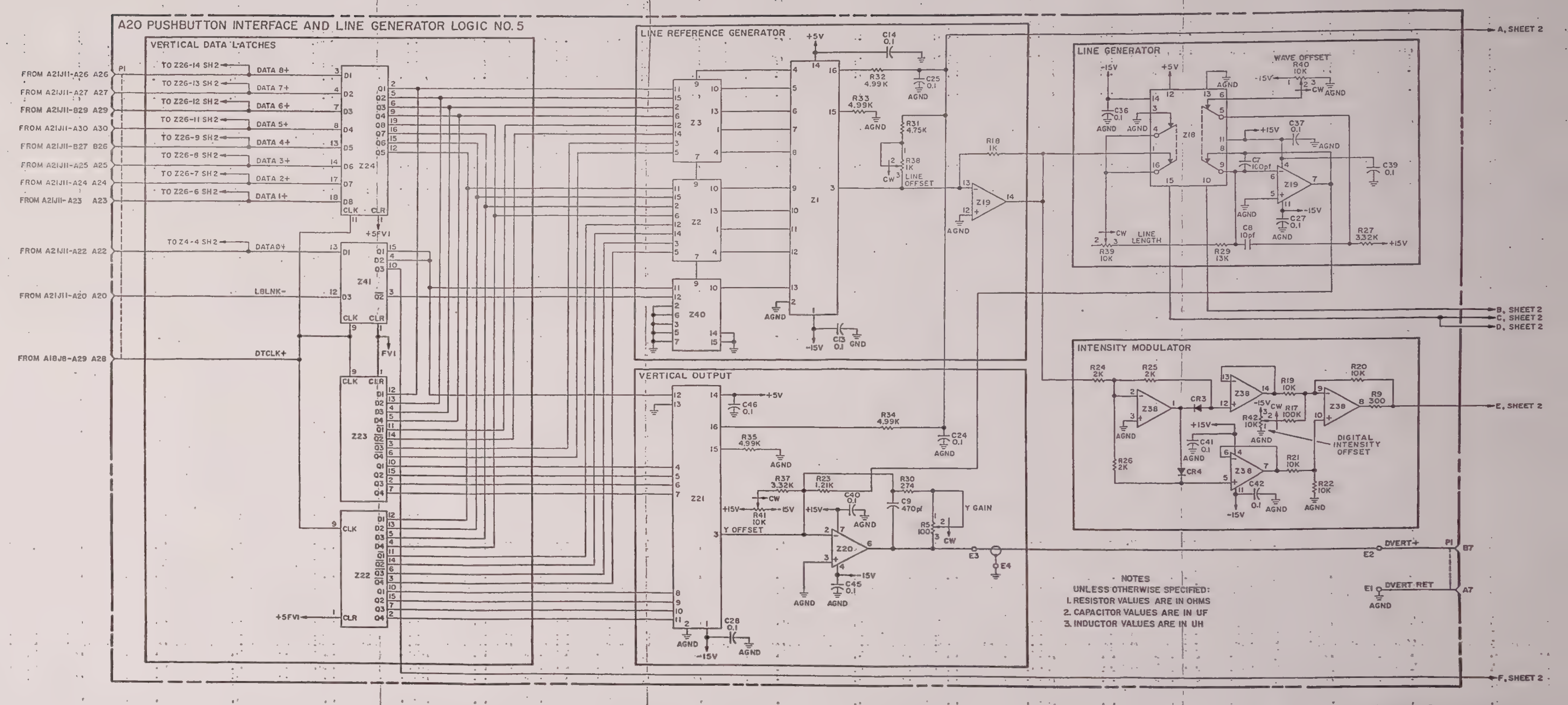

A19 DISPLAY TIMING AND HORIZONTAL OUTPUT LOGIC NO. 4
HORIZONTAL OUTPUT AND MULTIPLEXER
VERTICAL OUTPUT MULTIPLEXER
LINE GENERATOR TIMING
NOTES
UNLESS OTHERWISE SPECIFIED
1. RESISTOR VALUES ARE IN OHMS
2 CAPACITOR VALUES ARE IN UF
3 INDUCTOR VALUES ARE IN UH
FROM A20J10-B4
FROM A21J11-B22
FROM A21J11-B23
SHEET 1, A
FROM A21J11-B17
FROM A21J11-B16
FROM A21J11-B15
FROM A21J11-B18
FROM A21J11-B11
FROM A21J11-B12
FROM A21J11-B13
FROM A21J11-B14
FROM A18J8-B19
FROM A18J8-B11
FROM A20J10-A7, A21J1-B6
FROM A21J11-A6
FROM A18J8-B25
SHEET 1, C
SHEET 1, B
FROM A20J10-B7
FROM A20J10-A7
FROM A21J11-B9
FROM A21J11-A9
+10V REF
ADD08+
ADD09+
ADD07+
ADD06+
ADD05+
ADD04+
ADD03+
ADD02+
ADD01+
ADD00+
HRCLK+
SBYPS+
RAMP RET
RAMP
4MHZXX
DVERT+
DVERT RET
BVIDEO
BVIDEO RET
Z3
Z4
Z11
Z5
Z16
Z6
Z12
Z18
Z20
Z21
+5FV
+5V
+15V
-15V
AGND
C13 0.1
R3 4.99K
C15 0.1
C4 6.8
R4 4.99K
C14 0.1
X GAIN
R5 221
R6 100
CW
TP3
TP5
TP2
TP4
C5 820pF
C11 0.1
X OFFSET
R7 10K
R2 7.5K
C27 1000pF
C12 0.1
C9 0.1
C16 0.1
C10 0.1
HORIZ
J1
TO A5-X
LGTCC+
TO A20J10-B12
LGTCC-
TO A20J10-B21
LGB08+
TO A21J11-B20
LGB04+
TO A20J10 A19
LGB02+
TO A21J11-A28, B28
LGB01+
TO A20J10-B17
LGNEN+
TO A20J10-B15
LGB16+
TO A21J11-B26
VERT
TO A5-Y
HORIZ RET
TO A5-X
VERT RET
TO A5-Y
FV

Figure 7-41. Display Timing and Horizontal Output Printed Circuit Board 1A19, Maintenance Schematic Diagram (Sheet 2 of 2)

PARTS LOCATION INDEX, PUSHBUTTON INTERFACE AND LINE GENERATOR LOGIC NO. 3 1A20

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	21K	C46	24M	R20	29L	Z8	14G
C2	20K	C47	13E	R21	30L	Z9	12G
C3	20K	C48	10D	R22	29M	Z10	11G
C4	20L	C49	27K	R23	27N	Z11	10G
C5	20K	C50	12C	R24	31O	Z12	9G
C6	10H	C51	11C	R25	30N	Z13	7F
C7	29O	C52	2C	R26	31M	Z14	6F
C8	30O	C53	8A	R27	30N	Z15	5F
C9	28N	C54	3B	R28	28O	Z16	4F
C10	21K			R29	27O	Z17	3F
C11	21L	CR1	28N	R30	27Q	Z18	30O
C12	20J	CR2	9H	R31	25P	Z19	26O
C13	24Q	CR3	30M	R32	25P	Z20	26N
C14	23Q	CR4	30M	R33	25O	Z21	24N
C15	21Q	CR5	26L	R34	25O	Z22	23N
C16	19R	CR6	26L	R35	25N	Z23	21N
C17	16Q			R36	27O	Z24	20N
C18	13H	J1	7H	R37	26Q	Z25	18N
C19	11H	J2	5H	R38	25Q	Z26	17N
C20	NOT USED			R39	27Q	Z27	15N
C21	8H	MP1	31R	R40	30Q	Z28	14E
C22	5G			R41	26Q	Z29	12E
C23	3G			R42	29Q	Z30	11E
C24	25P	Q1	28P	R43	27Q	Z31	10E
C25	25P	Q2	27L	R44	9A	Z32	9D
C26	27O			R45	7G	Z33	7D
C27	26O	R1	24K			Z34	6D
C28	24O	R2	28O	S1	17Q	Z35	5D
C29	22O	R3	27P			Z36	4D
C30	19O	R4	18Q	TP1	31R	Z37	3D
C31	17O	R5	26Q	TP2	31R	Z38	30M
C32	14F	R6	7G	TP3	30R	Z39	28L
C33	8E	R7	9H	TP4	29R	Z40	25K
C34	7E	R8	27O	TP5	28R	Z41	24K
C35	2E	R9	28L	TP6	28R	Z42	22L
C36	30N	R10	20Q	TP7	24R	Z43	22K
C37	29N	R11	20Q	TP8	20R	Z44	13B
C38	27N	R12	21Q			Z45	11B
C39	27O	R13	21Q	Z1	24P	Z46	10B
C40	26N	R14	26L	Z2	23P	Z47	9B
C41	30M	R15	26K	Z3	21P	Z48	7B
C42	29M	R16	28O	Z4	20P	Z49	6B
C43	28M	R17	29Q	Z5	19P	Z50	5B
C44	27M	R18	26P	Z6	17P	Z51	4B
C45	25M	R19	29M	Z7	16P	Z52	3B


WAVE OFFSET
DIGITAL INTENSITY OFFSET
LINE LENGTH
Y OFFSET
WAVEFORM CAL SWITCH
BYPASS INTENSITY GAIN
Y GAIN
LINE OFFSET
A35
A1
MP1
J1
J2


A20 PUSHBUTTON INTERFACE AND LINE GENERATOR LOGIC NO. 5
VERTICAL DATA LATCHES
FROM A21J11-A26 A26
FROM A21J11-A27 A27
FROM A21J11-B29 A29
FROM A21J11-A30 A30
FROM A21J11-B27 B26
FROM A21J11-A25 A25
FROM A21J11-A24 A24
FROM A21J11-A23 A23
FROM A21J11-A22 A22
FROM A21J11-A20 A20
FROM A18J8-A29 A28
TO Z26-14 SH2
TO Z26-13 SH2
TO Z26-12 SH2
TO Z26-11 SH2
TO Z26-9 SH2
TO Z26-8 SH2
TO Z26-7 SH2
TO Z26-6 SH2
TO Z4-4 SH2
DATA 8+
DATA 7+
DATA 6+
DATA 5+
DATA 4+
DATA 3+
DATA 2+
DATA 1+
DATA0+
LBLNK-
DTCLK+
+5FVI
FVI
Z24
Z41
Z23
Z22
LINE REFERENCE GENERATOR
Z3
Z2
Z40
Z1
VERTICAL OUTPUT
Z21
Z20
Y OFFSET
Y GAIN
LINE GENERATOR
WAVE OFFSET
LINE LENGTH
Z18
Z19
INTENSITY MODULATOR
DIGITAL INTENSITY OFFSET
Z38
A, SHEET 2
B, SHEET 2
C, SHEET 2
D, SHEET 2
E, SHEET 2
F, SHEET 2
DVERT+
DVERT RET
E1
E2
E3
E4
P1
B7
A7
AGND
+15V
-15V
+5V

NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH

Figure 7-42. Pushbutton Interface and Line Generator Printed Circuit Board 1A20, Maintenance Schematic Diagram (Sheet 1 of 4)

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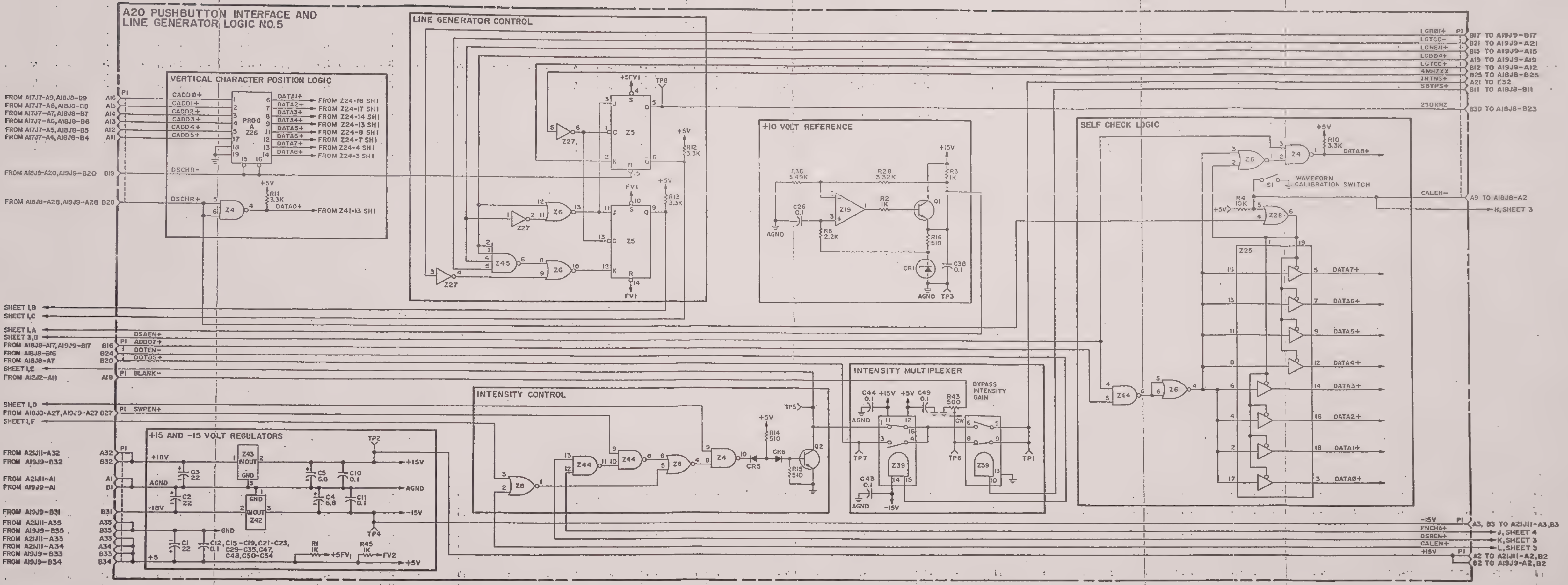

A20 PUSHBUTTON INTERFACE AND LINE GENERATOR LOGIC NO.5
VERTICAL CHARACTER POSITION LOGIC
LINE GENERATOR CONTROL
+10 VOLT REFERENCE
SELF CHECK LOGIC
INTENSITY CONTROL
INTENSITY MULTIPLEXER
+15 AND -15 VOLT REGULATORS
FROM A17J7-A9, A18J8-B9 A16
FROM A17J7-A8, A18J8-B8 A15
FROM A17J7-A7, A18J8-B7 A14
FROM A17J7-A6, A18J8-B6 A13
FROM A17J7-A5, A18J8-B5 A12
FROM A17J7-A4, A18J8-B4 A11
FROM A18J8-A20, A19J9-B20 B19
FROM A18J8-A28, A19J9-A28 B28
CADD0+
CADD1+
CADD2+
CADD3+
CADD4+
CADD5+
DSCHR-
DSCHR+
PROG A Z26
DATA1+ FROM Z24-18 SH1
DATA2+ FROM Z24-17 SH1
DATA3+ FROM Z24-14 SH1
DATA4+ FROM Z24-13 SH1
DATA5+ FROM Z24-8 SH1
DATA6+ FROM Z24-7 SH1
DATA7+ FROM Z24-4 SH1
DATA8+ FROM Z24-3 SH1
DATA0+ FROM Z41-13 SH1
SHEET 1,B
SHEET 1,C
SHEET 1,A
SHEET 3,G
FROM A18J8-A17, A19J9-B17 B16
FROM A18J8-B16 B24
FROM A18J8-A7 B20
SHEET 1,E
FROM A12J2-A11 A18
SHEET 1,D
FROM A18J8-A27, A19J9-A27 B27
SHEET 1,F
DSAEN+
ADDO7+
DOTEN-
DOTDS+
BLANK-
SWPEN+
FROM A2WJ11-A32 A32
FROM A19J9-B32 B32
FROM A2WJ11-A1 A1
FROM A19J9-A1 B1
FROM A19J9-B31 B31
FROM A2WJ11-A35 A35
FROM A19J9-B35 B35
FROM A21J11-A33 A33
FROM A21J11-A34 A34
FROM A19J9-B33 B33
FROM A19J9-B34 B34
+18V
AGND
-18V
+5
Z43 IN OUT GND
Z42 GND IN OUT
C3 22
C2 22
C1 22
C5 6.8
C4 6.8
C10 0.1
C11 0.1
C12, C15-C19, C21-C23, C29-C35, C47, C48, C50-C54 0.1
R1 1K +5FV1
R45 1K FV2
TP2
TP4
+15V
-15V
GND
+5V
+5FV1
TP8
Z27
Z5
Z6
Z45
R12 3.3K
R13 3.3K
R11 3.3K
FV1
Z4
R36 5.49K
R28 3.32K
R3 1K
R2 1K
R8 2.2K
R16 510
C26 0.1
C38 0.1
Z19
Q1
CR1
AGND
TP3
Z8
Z44
R14 510
R15 510
CR5
CR6
Q2
TP5
C44 0.1
C49 0.1
R43 500
BYPASS INTENSITY GAIN
Z39
C43 0.1
TP7
TP6
TP1
R10 3.3K
DATA8+
S1 WAVEFORM CALIBRATION SWITCH
R4 10K
Z28
CALEN-
A9 TO A18J8-A2
H, SHEET 3
Z25
DATA7+
DATA6+
DATA5+
DATA4+
DATA3+
DATA2+
DATA1+
DATA0+
LGB01+ P1 B17 TO A19J9-B17
LGTCC- B21 TO A19J9-A21
LGNEN+ B15 TO A19J9-A15
LGB04+ A19 TO A19J9-A19
LGTCC+ B12 TO A19J9-A12
4MHZXX B25 TO A18J8-B25
INTNS+ A21 TO E32
SBYPS+ B11 TO A18J8-B11
250KHZ B30 TO A18J8-B23
-15V P1 A3, B3 TO A21J11-A3,B3
ENCHA+ J, SHEET 4
DSBEN+ K, SHEET 3
CALEN+ L, SHEET 3
+15V P1 A2 TO A2WJ11-A2,B2
B2 TO A19J9-A2,B2

Figure 7-42. Pushbutton Interface and Line Generator Printed Circuit Board 1A20, Maintenance Schematic Diagram (Sheet 2 of 4)

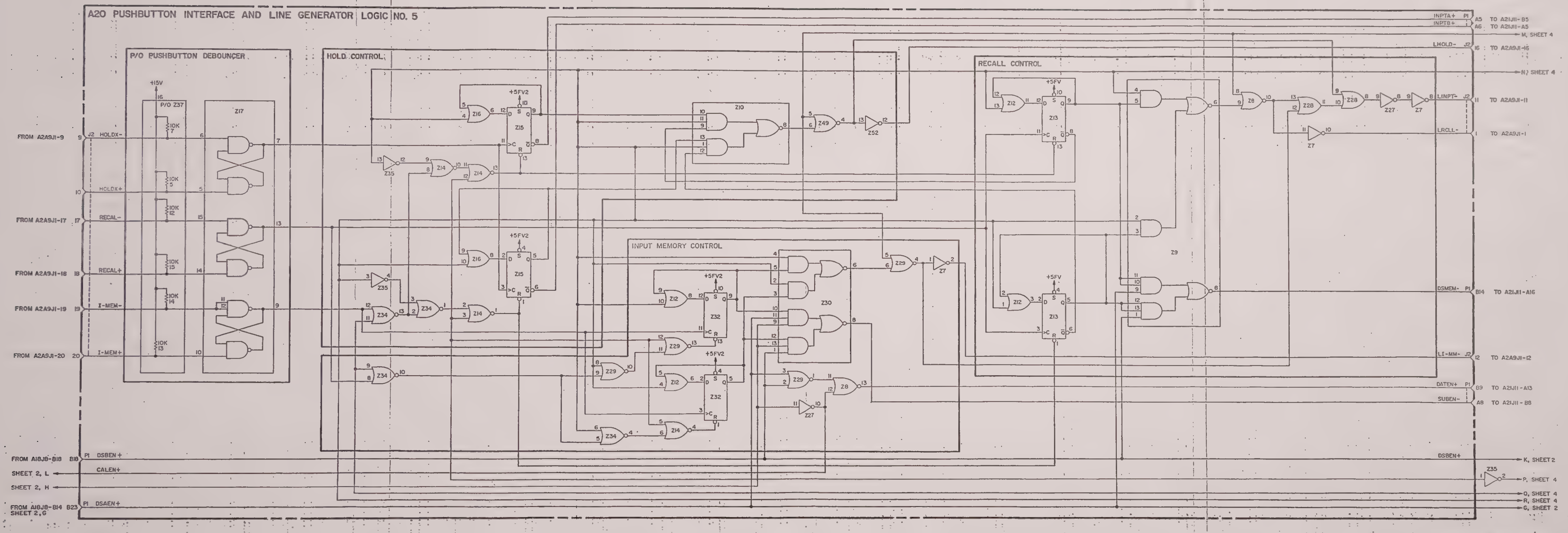

A20 PUSHBUTTON INTERFACE AND LINE GENERATOR LOGIC NO. 5
P/O PUSHBUTTON DEBOUNCER
HOLD CONTROL
INPUT MEMORY CONTROL
RECALL CONTROL
+15V
P/O Z37
Z17
10K
FROM A2A9J1-9
HOLDX-
HOLDX+
FROM A2A9J1-17
RECAL-
FROM A2A9J1-18
RECAL+
FROM A2A9J1-19
I-MEM-
FROM A2A9J1-20
I-MEM+
FROM A18J8-B18
DSBEN+
SHEET 2, L
CALEN+
SHEET 2, H
FROM A18J8-B14
SHEET 2, G
DSAEN+
+5FV2
+5FV
Z10
Z12
Z13
Z14
Z15
Z16
Z27
Z28
Z29
Z30
Z32
Z34
Z35
Z49
Z52
Z7
Z8
Z9
INPTA+
INPTB+
TO A21J11-B5
TO A21J11-A5
M, SHEET 4
LHOLD-
TO A2A9J1-16
N, SHEET 4
LINPT-
TO A2A9J1-11
LRCLL-
TO A2A9J1-1
DSMEM-
TO A21J11-A16
LI-MM-
TO A2A9J1-12
DATEN+
TO A21J11-A13
SUBEN-
TO A21J11-B8
DSBEN+
K, SHEET 2
P, SHEET 4
O, SHEET 4
R, SHEET 4
G, SHEET 2

Figure 7-42. Pushbutton Interface and Line Generator Printed Circuit Board 1A20, Maintenance Schematic Diagram (Sheet 3 of 4)

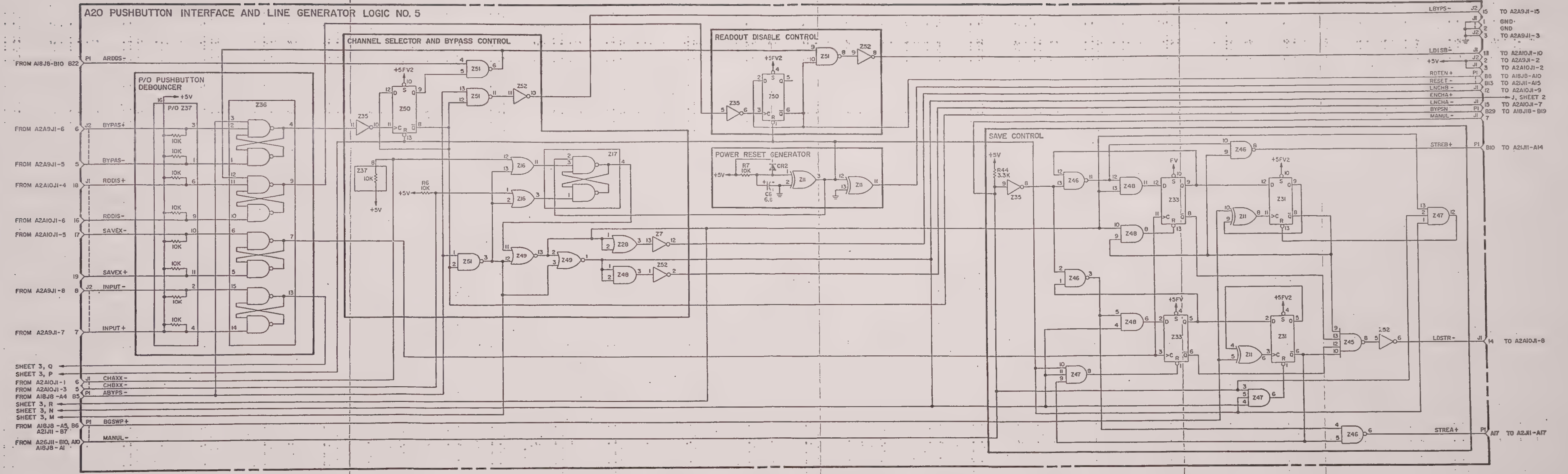
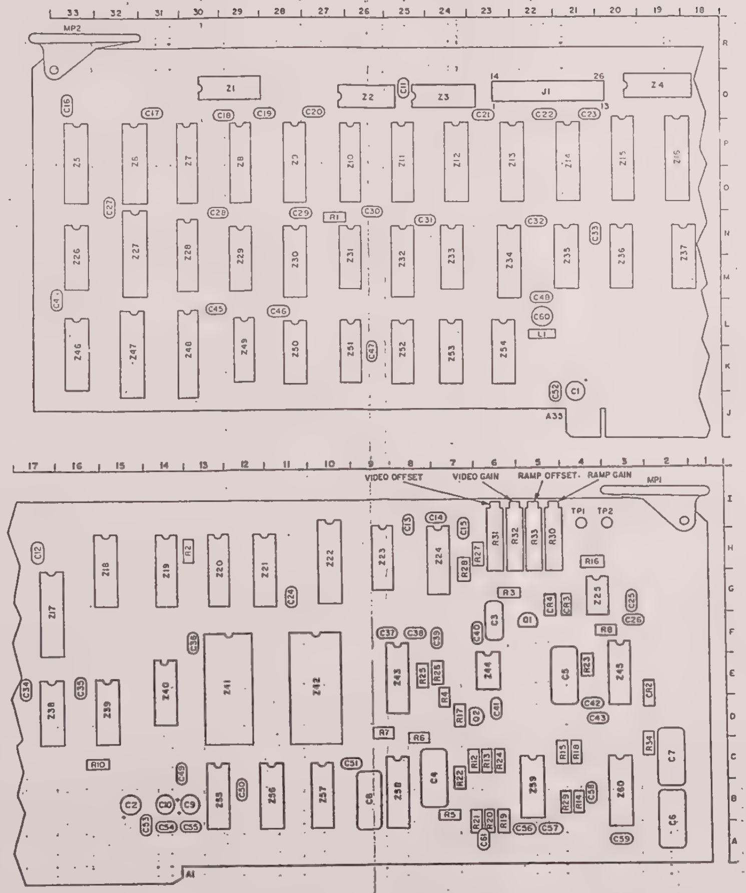
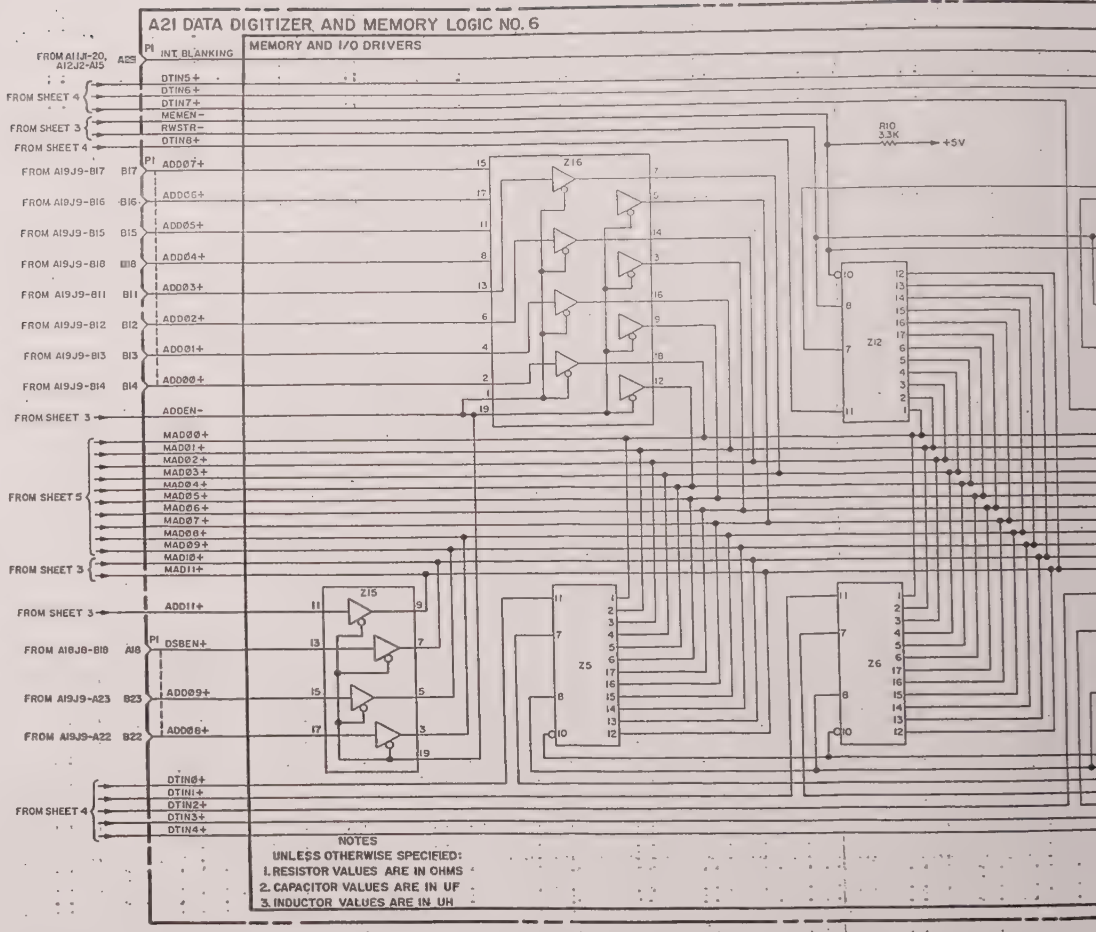

A20 PUSHBUTTON INTERFACE AND LINE GENERATOR LOGIC NO. 5
P/O PUSHBUTTON DEBOUNCER
P/O Z37
Z36
CHANNEL SELECTOR AND BYPASS CONTROL
READOUT DISABLE CONTROL
POWER RESET GENERATOR
SAVE CONTROL
FROM A18J8-B10 B22
ARDDS-
FROM A2A9J1-6
BYPAS+
FROM A2A9J1-5
BYPAS-
FROM A2A10J1-4
RDDIS+
FROM A2A10J1-6
RDDIS-
FROM A2A10J1-5
SAVEX-
SAVEX+
FROM A2A9J1-8
INPUT-
FROM A2A9J1-7
INPUT+
SHEET 3, Q
SHEET 3, P
FROM A2A10J1-1
CHAXX-
FROM A2A10J1-3
CHBXX-
FROM A18J8-A4 B5
ABYPS-
SHEET 3, R
SHEET 3, N
SHEET 3, M
FROM A18J8-A5, B6 A21J11-B7
BGSWP+
FROM A26J11-B10, A10 A18J8-A1
MANUL-
LBYPS-
TO A2A9J1-15
GND
GND
TO A2A9J1-3
LDISB-
TO A2A10J1-10
+5V
TO A2A9J1-2
TO A2A10J1-2
RDTEN+
TO A18JB-A10
RESET-
TO A21J11-A15
LNCHB-
TO A2A10J1-9
ENCHA+
J, SHEET 2
LNCHA-
TO A2A10J1-7
BYPSN
TO A18J18-B19
MANUL-
STREB+
TO A21J11-A14
LDSTR-
TO A2A10J1-8
STREA+
TO A2J11-A17

Figure 7-42. Pushbutton Interface and Line Generator Printed Circuit Board 1A20, Maintenance Schematic Diagram (Sheet 4 of 4)

PARTS LOCATION INDEX, DATA DIGITIZER AND MEMORY LOGIC NO. 6 1A21

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	21K	C41	6D	R4	7D	Z6	31P
C2	15B	C42	4D	R5	7B	Z7	30P
C3	6G	C43	4D	R6	8D	Z8	29P
C4	8B	C44	33M	R7	9D	Z9	28P
C5	5E	C45	30L	R8	4F	Z10	26P
C6	2B	C46	28L	R9	NOT USED	Z11	25P
C7	2C	C47	26K	R10	16C	Z12	24P
C8	9B	C48	21L	R11	NOT USED	Z13	22P
C9	13B	C49	14C	R12	7C	Z14	21P
C10	14B	C50	12B	R13	6C	Z15	20P
C11	25Q	C51	9C	R14	4B	Z16	19P
C12	17H	C52	22K	R15	5C	Z17	17G
C13	8I	C53	15B	R16	4H	Z18	15H
C14	7I	C54	14B	R17	7D	Z19	14H
C15	7I	C55	14B	R18	4C	Z20	13H
C16	33Q	C56	5A	R19	6B	Z21	12H
C17	31Q	C57	5A	R20	6B	Z22	10H
C18	29Q	C58	4B	R21	7B	Z23	9H
C19	28Q	C59	3A	R22	7C	Z24	7H
C20	27Q	C60	22L	R23	4E	Z25	4G
C21	23Q	C61	6A	R24	6C	Z26	33M
C22	22Q			R25	8E	Z27	32M
C23	21Q	CR1	NOT USED	R26	7E	Z28	30M
C24	11G	CR2	2D	R27	6H	Z29	29M
C25	3G	CR3	4G	R28	7H	Z30	28M
C26	3F	CR4	5G	R29	5B	Z31	26M
C27	32O			R30	5H	Z32	25M
C28	29O	J1	22Q	R31	6H	Z33	24M
C29	28O			R32	6H	Z34	22M
C30	26O	L1	22K	R33	5H	Z35	21M
C31	24N			R34	3C	Z36	20M
C32	22N	MP1	2I			Z37	19M
C33	21N	MP2	33R	TP1	4I	Z38	17D
C34	17E			TP2	3I	Z39	16D
C35	16E	Q1	5F			Z40	14E
C36	13F	Q2	7D	Z1	29Q	Z41	12E
C37	9F			Z2	26Q	Z42	10E
C38	8F	R1	27N	Z3	24Q	Z43	8E
C39	7F	R2	13H	Z4	19Q	Z44	6E
C40	6F	R3	6G	Z5	33P		


MP2
Z1
Z2
Z3
J1
Z4
VIDEO OFFSET
VIDEO GAIN
RAMP OFFSET
RAMP GAIN
MP1
TP1
TP2
A33
A1


A21 DATA DIGITIZER AND MEMORY LOGIC NO. 6
MEMORY AND I/O DRIVERS
FROM A11J1-20, A12J2-A15
A25
P1
INT. BLANKING
FROM SHEET 4
DTIN5+
DTIN6+
DTIN7+
FROM SHEET 3
MEMEN−
RWSTR−
FROM SHEET 4
DTIN8+
FROM A19J9-B17
B17
ADD07+
FROM A19J9-B16
B16
ADD06+
FROM A19J9-B15
B15
ADD05+
FROM A19J9-B18
B18
ADD04+
FROM A19J9-B11
B11
ADD03+
FROM A19J9-B12
B12
ADD02+
FROM A19J9-B13
B13
ADD01+
FROM A19J9-B14
B14
ADD00+
FROM SHEET 3
ADDEN−
Z16
R10
3.3K
+5V
Z12
MAD00+
MAD01+
MAD02+
MAD03+
MAD04+
MAD05+
MAD06+
MAD07+
MAD08+
MAD09+
FROM SHEET 5
MAD10+
MAD11+
FROM SHEET 3
FROM SHEET 3
ADD11+
Z15
FROM A18J8-B18
A18
DSBEN+
FROM A19J9-A23
B23
ADD09+
FROM A19J9-A22
B22
ADD08+
Z5
Z6
FROM SHEET 4
DTIN0+
DTIN1+
DTIN2+
DTIN3+
DTIN4+
NOTES
UNLESS OTHERWISE SPECIFIED:
1. RESISTOR VALUES ARE IN OHMS
2. CAPACITOR VALUES ARE IN UF
3. INDUCTOR VALUES ARE IN UH

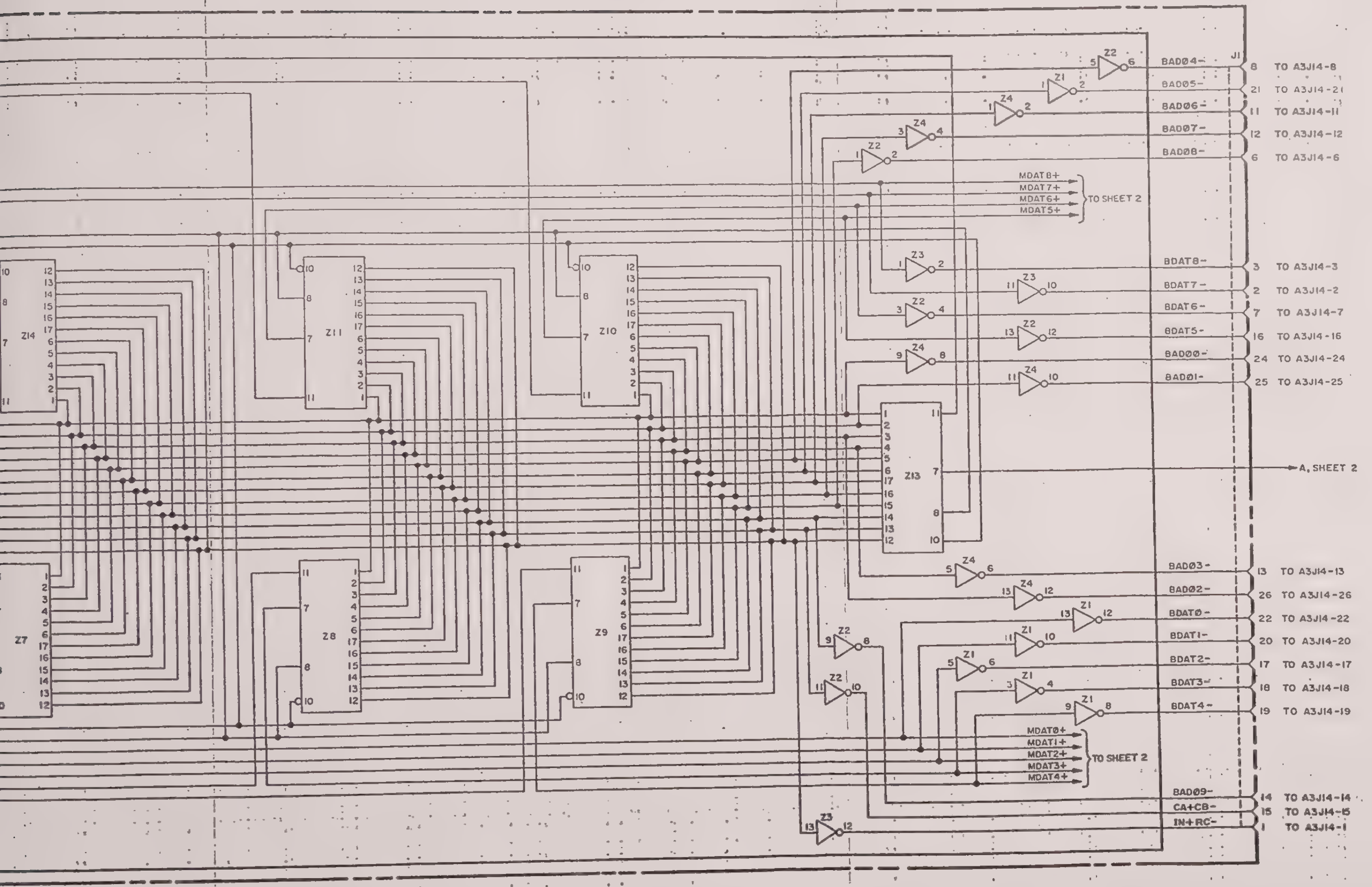

Z2
BAD04-
J1
8 TO A3J14-8
Z1
BAD05-
21 TO A3J14-21
Z4
BAD06-
11 TO A3J14-11
Z4
BAD07-
12 TO A3J14-12
Z2
BAD08-
6 TO A3J14-6
MDAT8+
MDAT7+
MDAT6+
MDAT5+
TO SHEET 2
Z14
Z11
Z10
Z3
BDAT8-
3 TO A3J14-3
Z3
BDAT7-
2 TO A3J14-2
Z2
BDAT6-
7 TO A3J14-7
Z2
BDAT5-
16 TO A3J14-16
Z4
BAD00-
24 TO A3J14-24
Z4
BAD01-
25 TO A3J14-25
Z13
A, SHEET 2
Z7
Z8
Z9
Z4
BAD03-
13 TO A3J14-13
Z4
BAD02-
26 TO A3J14-26
Z1
BDAT0-
22 TO A3J14-22
Z1
BDAT1-
20 TO A3J14-20
Z1
BDAT2-
17 TO A3J14-17
Z1
BDAT3-
18 TO A3J14-18
Z2
Z2
Z1
BDAT4-
19 TO A3J14-19
MDAT0+
MDAT1+
MDAT2+
MDAT3+
MDAT4+
TO SHEET 2
BAD09-
14 TO A3J14-14
CA+CB-
15 TO A3J14-15
Z3
IN+RC-
1 TO A3J14-1

Figure 7-43: Data Digitizer and Memory Logic Printed Circuit Board 1A21, Maintenance Schematic Diagram (Sheet 1 of 5) 7-129/130 blank

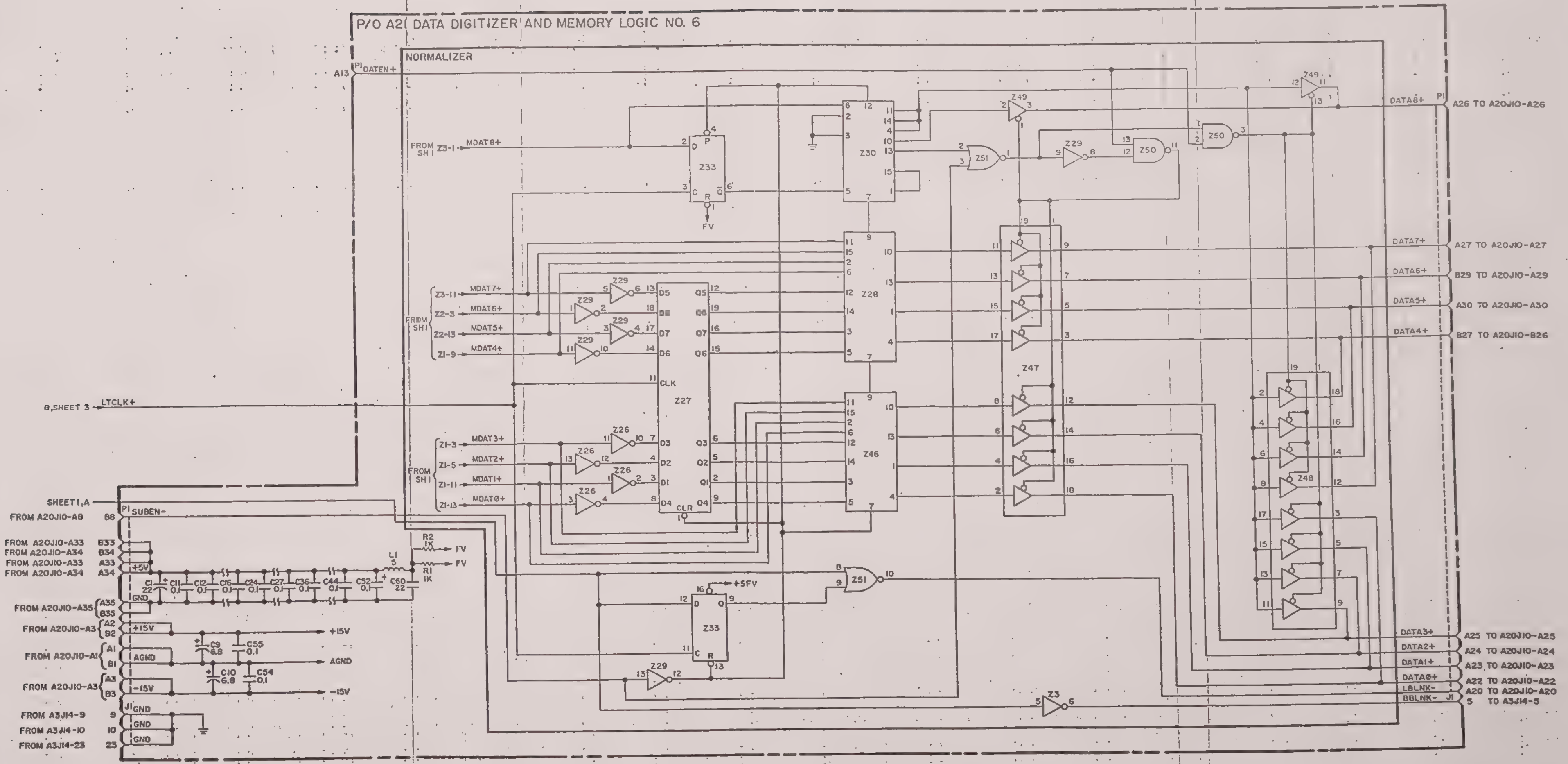

P/O A21 DATA DIGITIZER AND MEMORY LOGIC NO. 6
NORMALIZER
A13 DATEN+
FROM SH1 Z3-1 MDAT8+
Z33
Z30
Z51
Z29
Z50
Z49
DATA8+
A26 TO A20J10-A26
Z3-11 MDAT7+
Z2-3 MDAT6+
Z2-13 MDAT5+
Z1-9 MDAT4+
FROM SH1
Z27
Z28
Z47
DATA7+
A27 TO A20J10-A27
DATA6+
B29 TO A20J10-A29
DATA5+
A30 TO A20J10-A30
DATA4+
B27 TO A20J10-B26
9,SHEET 3 LTCLK+
Z1-3 MDAT3+
Z1-5 MDAT2+
Z1-11 MDAT1+
Z1-13 MDAT0+
Z26
Z46
Z48
SHEET1,A
FROM A20J10-A8 B8 SUBEN-
FROM A20J10-A33 B33
FROM A20J10-A34 B34
FROM A20J10-A33 A33
FROM A20J10-A34 A34
+5V
R2 1K FV
R1 1K FV
L1 5
C1 22
C11 0.1
C12 0.1
C16 0.1
C24 0.1
C27 0.1
C36 0.1
C44 0.1
C52 0.1
C60 22
GND
FROM A20J10-A35 A35 B35
FROM A20J10-A3 A2 B2 +15V
+15V
C9 6.8
C55 0.1
FROM A20J10-A1 A1 B1 AGND
AGND
C10 6.8
C54 0.1
FROM A20J10-A3 A3 B3 -15V
-15V
FROM A3J14-9 9 GND
FROM A3J14-10 10 GND
FROM A3J14-23 23 GND
+5FV
Z23
DATA3+
A25 TO A20J10-A25
DATA2+
A24 TO A20J10-A24
DATA1+
A23 TO A20J10-A23
DATA0+
A22 TO A20J10-A22
LBLNK-
A20 TO A20J10-A20
BBLNK- J1
5 TO A3J14-5

Figure 7-43. Data Digitizer and Memory Logic Printed Circuit Board 1A21, Maintenance Schematic Diagram (Sheet 2 of 5)

7-131/132 blank

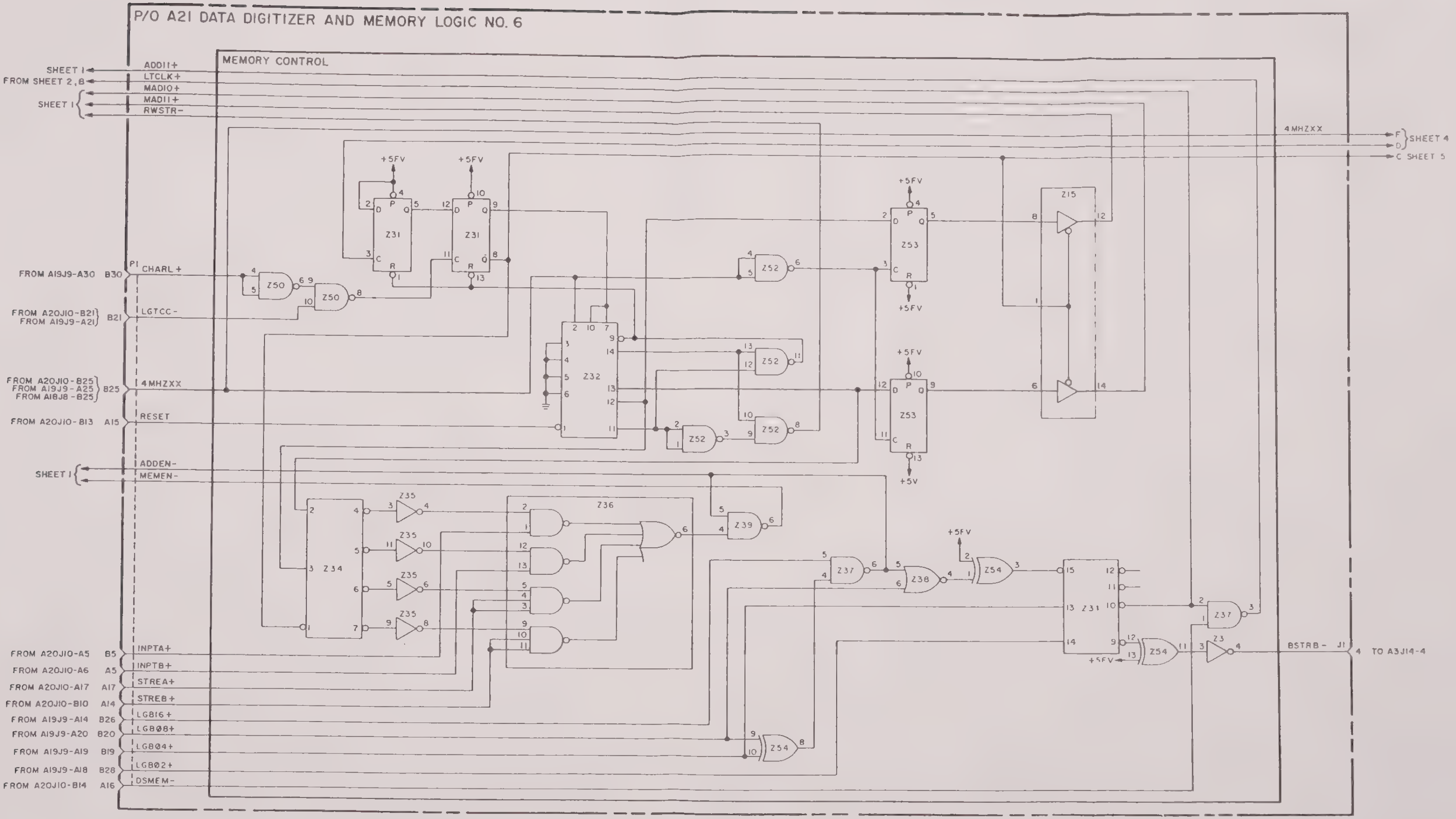

P/O A21 DATA DIGITIZER AND MEMORY LOGIC NO. 6
MEMORY CONTROL
SHEET 1
FROM SHEET 2, 8
SHEET 1
ADD11+
LTCLK+
MAD10+
MAD11+
RWSTR-
4MHZXX
F
D
C
SHEET 4
SHEET 5
FROM A19J9-A30 B30
P1
CHARL+
FROM A20J10-B21
FROM A19J9-A21
B21
LGTCC-
FROM A20J10-B25
FROM A19J9-A25
FROM A18J8-B25
B25
4MHZXX
FROM A20J10-B13 A15
RESET
SHEET 1
ADDEN-
MEMEN-
FROM A20J10-A5 B5
INPTA+
FROM A20J10-A6 A5
INPTB+
FROM A20J10-A17 A17
STREA+
FROM A20J10-B10 A14
STREB+
FROM A19J9-A14 B26
LGB16+
FROM A19J9-A20 B20
LGB08+
FROM A19J9-A19 B19
LGB04+
FROM A19J9-A18 B28
LGB02+
FROM A20J10-B14 A16
DSMEM-
+5FV
Z31
Z50
Z32
Z52
Z53
Z15
+5V
Z35
Z34
Z36
Z39
Z37
Z38
Z54
Z3
BSTRB-
J1
TO A3J14-4

Figure 7-43. Data Digitizer and Memory Logic Printed Circuit Board 1A21, Maintenance Schematic Diagram (Sheet 3 of 5)

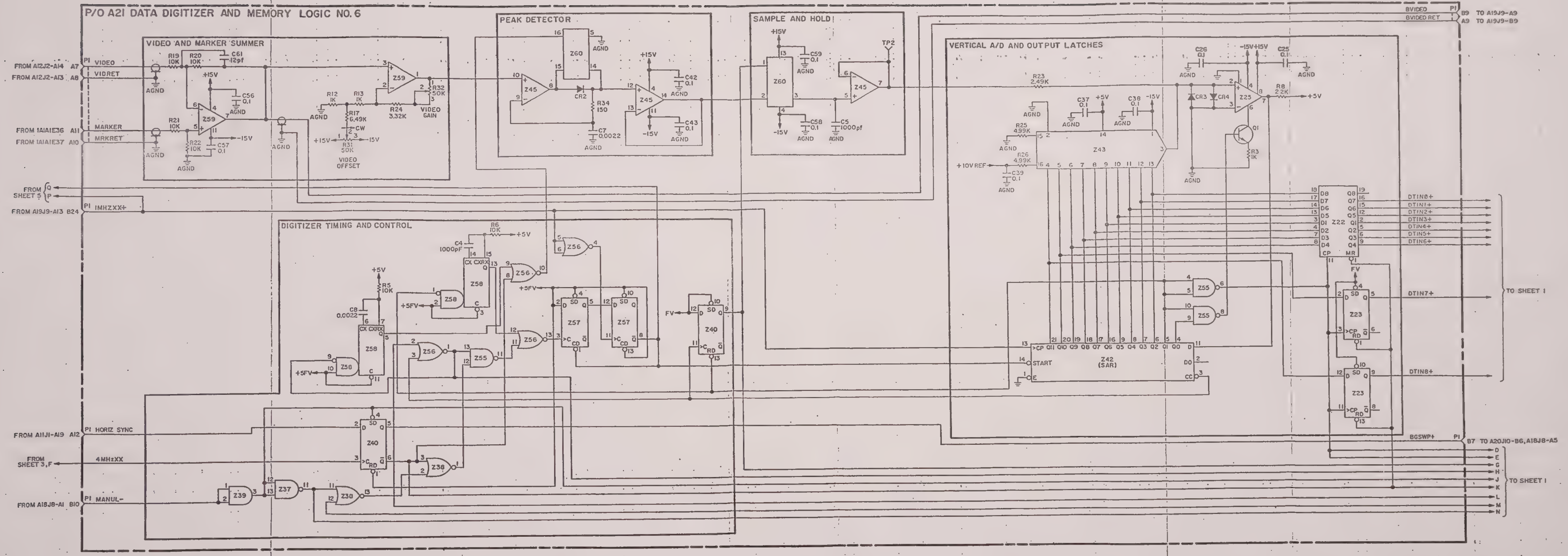

P/O A21 DATA DIGITIZER AND MEMORY LOGIC NO. 6
VIDEO AND MARKER SUMMER
PEAK DETECTOR
SAMPLE AND HOLD
VERTICAL A/D AND OUTPUT LATCHES
DIGITIZER TIMING AND CONTROL
FROM A12J2-A14 A7
FROM A12J2-A13 A8
FROM 1A1A1E36 A11
FROM 1A1A1E37 A10
VIDEO
VIDRET
MARKER
MRKRET
FROM SHEET 5
FROM A19J9-A13 B24
IMHZXX+
FROM A11J1-A19 A12
HORIZ SYNC
FROM SHEET 3, F
4MHzXX
FROM A18J8-A1 B10
MANUL-
VIDEO GAIN
VIDEO OFFSET
AGND
+10V REF
BVIDEO
BVIDEO RET
B9 TO A19J9-A9
A9 TO A19J9-B9
DTIN0+
DTIN1+
DTIN2+
DTIN3+
DTIN4+
DTIN5+
DTIN6+
DTIN7+
DTIN8+
TO SHEET 1
BGSWP+
B7 TO A20J10-B6, A18J8-A5
TO SHEET 1
Z22
Z23
Z25
Z37
Z38
Z39
Z40
Z42 (SAR)
Z43
Z45
Z55
Z56
Z57
Z58
Z59
Z60
TP2
FV
+5FV

Figure 7-43. Data Digitizer and Memory Logic Printed Circuit Board 1A21, Maintenance Schematic Diagram (Sheet 4 of 5)

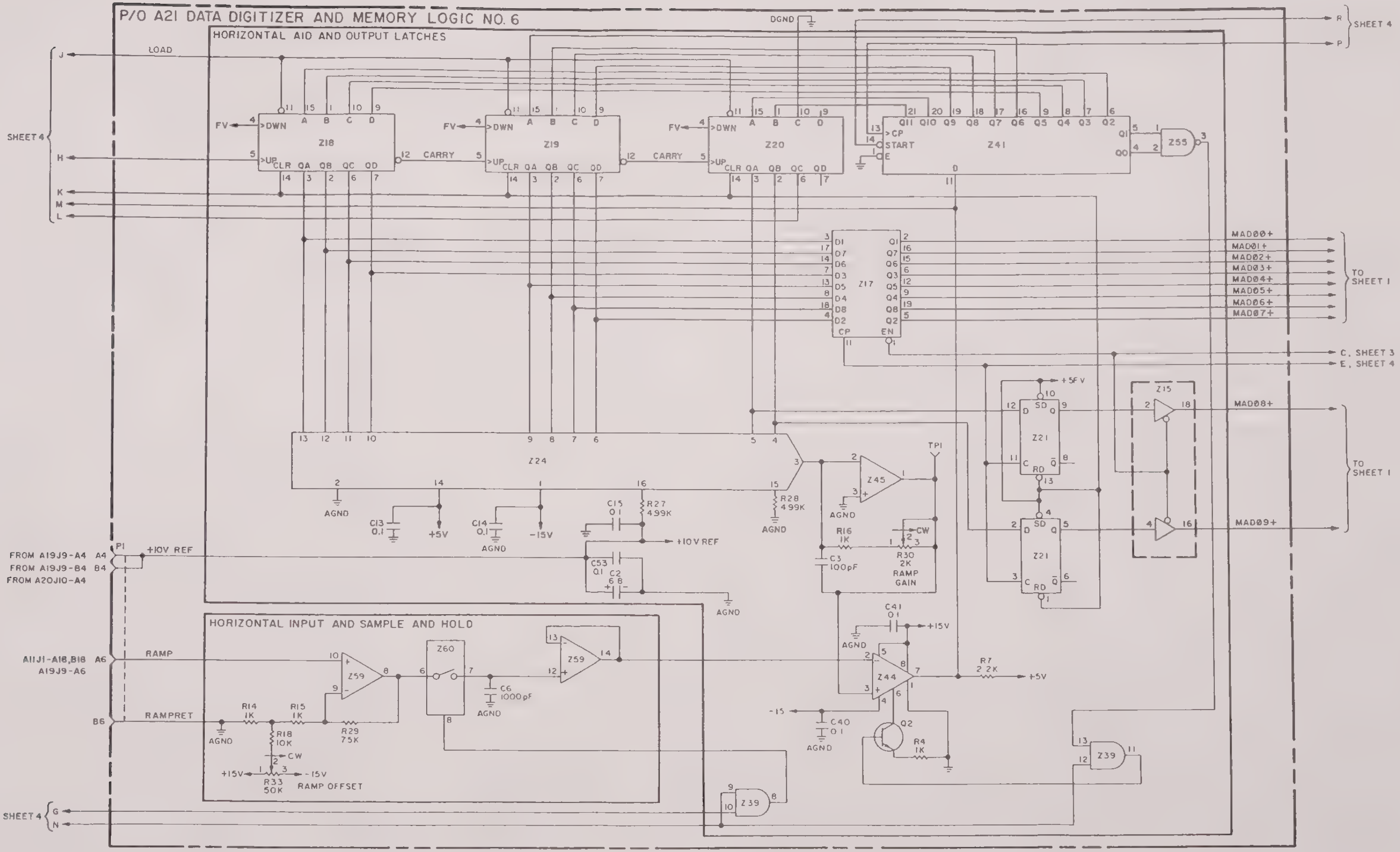
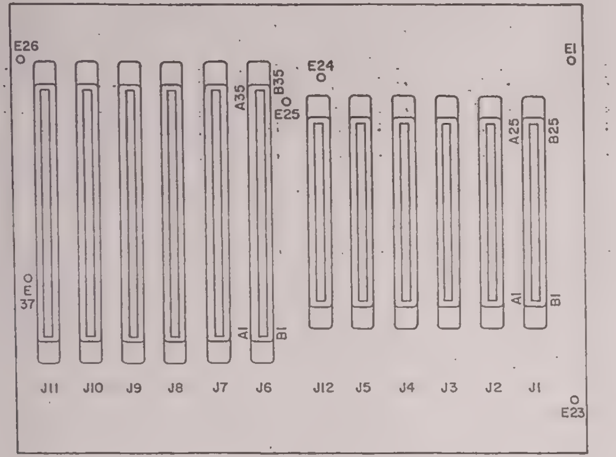

P/O A21 DATA DIGITIZER AND MEMORY LOGIC NO. 6
HORIZONTAL A/D AND OUTPUT LATCHES
HORIZONTAL INPUT AND SAMPLE AND HOLD
LOAD
SHEET 4
J
H
K
M
L
R
P
DGND
FV
DWN
UP
CLR
CARRY
Z18
Z19
Z20
Z41
Z55
Z17
Z24
Z21
Z15
Z45
Z44
Z59
Z60
Z39
Q2
START
CP
EN
MAD00+
MAD01+
MAD02+
MAD03+
MAD04+
MAD05+
MAD06+
MAD07+
MAD08+
MAD09+
TO SHEET 1
C, SHEET 3
E, SHEET 4
+5FV
TP1
AGND
+5V
-15V
+10V REF
C13 0.1
C14 0.1
C15 0.1
R27 4.99K
R28 4.99K
R16 1K
R30 2K RAMP GAIN
C3 100pF
C53 0.1
C2 6.8
C41 0.1
C40 0.1
R7 2.2K
R4 1K
CW
P1
FROM A19J9-A4 A4
FROM A19J9-B4 B4
FROM A20J10-A4
A11J1-A18,B18 A6
A19J9-A6
B6
RAMP
RAMPRET
R14 1K
R15 1K
R18 10K
R29 75K
R33 50K
RAMP OFFSET
C6 1000pF
+15V
-15
SHEET 4
G
N

Figure 7-43. Data Digitizer and Memory Logic Printed Circuit Board 1A21, Maintenance Schematic Diagram (Sheet 5 of 5)


E26
E24
E1
E25
A35
B35
A1
B1
A25
B25
E37
E23
J11
J10
J9
J8
J7
J6
J12
J5
J4
J3
J2
J1

CONNECTOR	KEYING POSITION BETWEEN
J1	A2-A3
J2	A4-A5
J3	A6-A7
J4	A8-A9
J5	A10-A11
J6	A25-A26
J7	A27-A28
J8	A31-A32
J9	A29-A30
J10	A29-A30
J11	A31-A32
J12	–

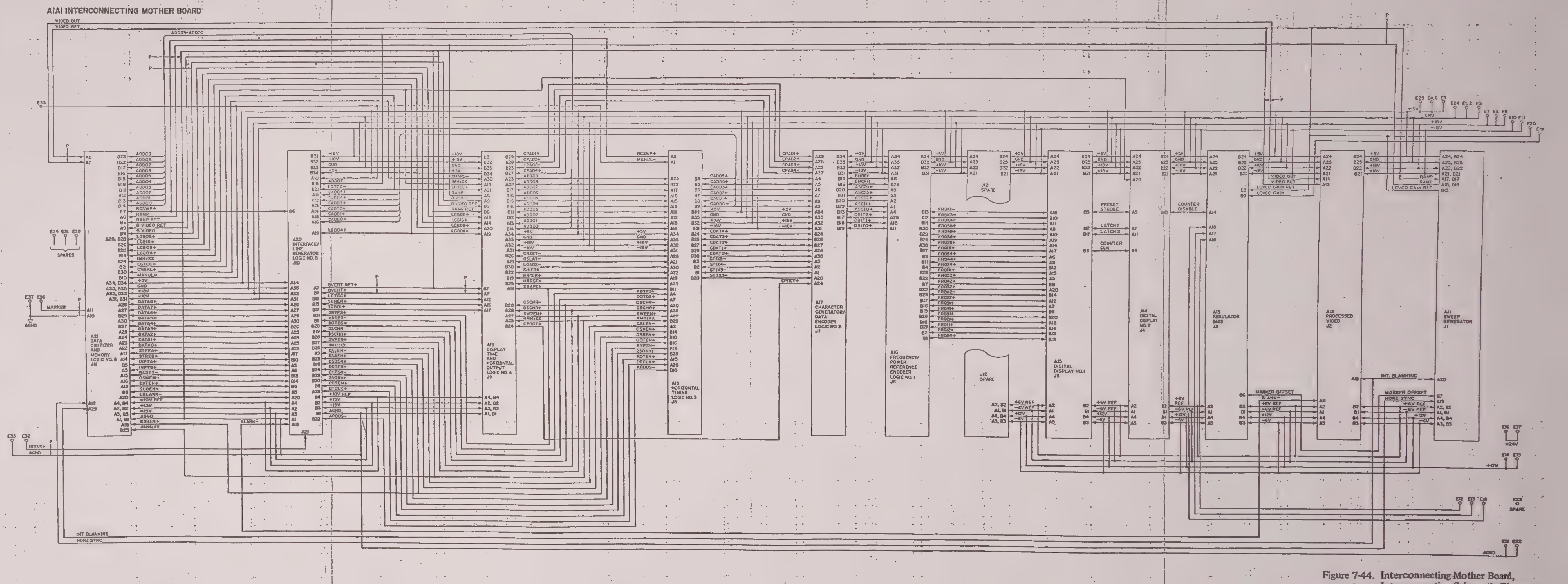

A1A1 INTERCONNECTING MOTHER BOARD
VIDEO OUT
VIDEO RET
AD009-AD000
E33
E34 E31 E30
SPARES
E37 E36
MARKER
AGND
E33 E32
INTNS+
AGND
A21 DATA DIGITIZER AND MEMORY LOGIC NO. 6 J11
A20 INTERFACE/ LINE GENERATOR LOGIC NO. 5 J10
A19 DISPLAY TIME AND HORIZONTAL OUTPUT LOGIC NO. 4 J9
A18 HORIZONTAL TIMING LOGIC NO. 3 J8
A17 CHARACTER GENERATOR/ DATA ENCODER LOGIC NO. 2 J7
A16 FREQUENCY/ POWER REFERENCE ENCODER LOGIC NO. 1 J6
J12 SPARE
A15 DIGITAL DISPLAY NO. 1 J5
A14 DIGITAL DISPLAY NO. 2 J4
A13 REGULATOR BIAS J3
A12 PROCESSED VIDEO J2
A11 SWEEP GENERATOR J1
PRESET STROBE
LATCH 1
LATCH 2
COUNTER CLK
COUNTER DISABLE
LCVCO GAIN RET
LCVCO GAIN
RAMP
INT. BLANKING
MARKER OFFSET
HORZ SYNC
BLANK−
+6V REF
−6V REF
+12V
−6V
+5V
GND
+18V
−18V
E16 E17
+24V
E14 E15
+12V
E22 E21 E18
SPARE
E20 E22
INT BLANKING
HORIZ SYNC

Figure 7-44. Interconnecting Mother Board, Interconnecting Schematic Diagram

7-139/140 blank

Table 7-4. Wire Run List

From	To	Function
1A1 INTERCONNECTING BOARD		
1A1E7	1A4TB3-3	+18V
E8	1A2A4S1-1F-2	+18V
E9	1A4TB3-4	+18V SENSE
E10	1A4TB3-8	-18V
E11	1A4TB3-9	-18V SENSE
E12	1A1Q1-E	
E13	1A1Q1-C	
E16	1A4TB3-1	+24V
E17	1A3J13-1	LCVCO GAIN
E18	1A1Q1-B	
E20		GND RET
E21	1A4TB3-10	ANALOG GND
E22	1A4TB3-7	ANALOG GND
E24	1A4TB3-2	GND
E25	1A4TB3-12	+5 VDC
E32	1A5-Z	INTNS+
E35	1A2A6S1-3R-2	MANUAL-
E36	1A2A1S1-4R-21	MARKER
E37		SHIELD
1A2 FRONT PANEL ASSEMBLY		
1A2E1	1A2A1S1-1F-14	GND
	1A2A2-E1	GND
	1A2A3A1-TP6	GND
	1A2A3S1-5F-6	GND
	1A2A4S1-W2	GND
	1A2A5S1-2F-8	GND
	1A2A6S1-2R-32	GND
	1A2A10-E1	GND
	1A3-E1	GND
	1A4TB3-2	GND
	1A4TB3-5	GND
	J5-44	GND

From	To	Function
1A2A1 SCAN WIDTH SWITCH		
1A2A1S1-1F-14	1A2E1	GND
-1F-30	1A2A3S1-5R-8	
-1R-15	1A2A3S1-9R-12	
-2F-13	1A2A10J3-12	SHIELD
-2F-15	J5-37	FINE TUNING B
-2R-14	1A2A3S1-9R-4	
-3F-11	1A2A3S1-9F-11	
-3F-31	1A2A10J3-11	PHASE LOCK ENABLE
-3F-31	1A13J1-15	PHASE LOCK ENABLE
-3F-33	1A2A3S1-8F-10	
-3R-21	C1+	
-3R-23	1A2A3S1-8F-4	
-4F-38	1A2A3S1-8R-1	
-4R-21	1A1-E37	SHIELD
-4R-33	1A2A3A1-TP2	
-5F-12	J5-46	-18 VDC SWITCHED (FM)
-5F-30	1A13J1-36	COMB ENERGIZE A
-5F-30	J5-20	COMB ENERGIZE A
-5F-32	1A2A3S1-7F-2	-18V
-5F-32	J5-50	-18V
-5F-32	1A4TB3-8	-18V
-5R-33	1A13J1-31	COMB RESET
-6F-12	J5-47	+18 VDC SWITCHED
-6F-30	J5-21	+18 VDC TO LOOP
-6F-32	1A2A3S1-5F-12	
-6R-1	1A2A2S1-2F-3	
-6R-7	1A2A2S1-2R-20	
-6R-9	1A2A2S1-2R-18	
-6R-11	1A2A2S1-2R-16	
-6R-13	1A2A2S1-2R-14	
-6R-15	1A2A2S1-2R-12	
-6R-17	1A2A2S1-1F-10	
-6R-19	1A2A2S1-1F-8	
-6R-21	1A2A2S1-1F-6	
-6R-23	1A2A2S1-1F-4	
-6R-27	1A2A2S1-1F-24	
-6R-33	1A2A2S1-6R-15	
-7R-1	1A17J1-18	SW1X3-
-7R-3	1A17J1-19	SW3X3-
-7R-5	1A17J1-20	SW1X4-
-7R-7	1A17J1-30	SW3X4-
-7R-9	1A17J1-26	SW1X5-
-7R-11	1A17J1-27	SW3X5-
-7R-13	1A17J1-28	SW1X6-
-7R-15	1A17J1-29	SW3X6-
-7R-17	1A17J1-25	SW1X7-
-7R-19	1A17J1-24	SW3X7-
-7R-21	1A17J1-23	SW1X8-
-7R-23	1A17J1-15	SW2X8-
-7R-25	1A17J1-17	SW5X8-
-7R-27	1A17J1-16	SW7X8-

Table 7-4. Wire Run List (Continued)

From	To	Function
1A2A1S2-NC1	1A2A3S1-9R-3	
-NC2	1A2A2S2-NC2	
-W1	1A11J1-34	SCAN WIDTH VERNIER
-W2	1A2A2S2-W2	UNCAL
-W2	1A2A4-5-NC2	UNCAL
-W2	1A2A8J1-13	UNCAL
1A2A2 SCAN TIME/DIV SWITCH		
1A2A2S1-1F-4	1A2A1S1-6R-23	
-1F-6	1A2A1S1-6R-21	
-1F-8	1A2A1S1-6R-19	
-1F-10	1A2A1S1-6R-17	
-1F-24	1A2A1S1-6R-27	A11X3+
-1F-24	1A2A4S1-1F-12	A11X3+
-1F-24	1A17J1-38	A11X3+
-1R-22	1A2A4S1-1R-8	AI1X2+
-1R-22	1A17J1-31	AI1X2+
-2F-3	1A2A1S1-6R-1	
-2F-3	1A2A4S1-2R-10	
-2R-2	1A2A4S1-2F-9	A11X1+
-2R-2	1A17J1-33	
-2R-12	1A2A1S1-6R-15	
-2R-14	1A2A1S1-6R-13	
-2R-16	1A2A1S1-6R-11	
-2R-18	1A2A1S1-6R-9	
-2R-20	1A2A1S1-6R-7	
-3F-7	1A11J1-8	TIME RETRACE
-3F-11	1A11J1-10	SEC RETRACE
-3R-26	1A2A6S1-2F-7	REF SWEEP OUT
-3R-27	1A11J1-15	REF SWEEP OUT
-4F-29	1A136	MARKER
-4F-31	1A2A3S1-8R-8	
-4R-24	1A11J1-14	SCAN TIME IN
-6F-2	1A17J1-10	ST100-
-6F-4	1A17J1-12	ST3X0-
-6F-6	1A17J1-13	ST1X0-
-6F-8	1A17J1-14	ST3X1-
-6F-10	1A17J1-35	ST1X1-
-6F-12	1A17J1-36	ST3X2-
-6F-14	1A17J1-37	ST1X2-
-6F-16	1A18J1-4	ST3X3-
-6F-18	1A2A8J1-14	1 MEC
-6F-18	1A18J1-6	ST1X3-
-6F-20	1A2A8J1-15	.1 MEC
-6F-20	1A18J1-7	ST1X4-
-6F-22	1A2A8J1-16	.01 MEC
-6F-22	1A18J1-5	ST1X5-
-6F-26	1A2A4S2-W1	
-6R-3	1A2A8J1-8	
-6R-15	1A2A1S1-6R-33	
-6R-31	1A2A3S1-8R-11	
-6R-31	1A2A8J1-12	
1A2A2E1	1A2E1	

From	To	Function
1A2A2S2-NC2	1A2A1S2-NC2	GND
-W1	1A2A10J3-35	-6V REF
-W1	1A2R2-E3	-6 VDC
-W2	1A2A1S2-W2	UNCAL
1A2A3 RF RANGE SWITCH		
1A2A3A1-TP1	1A2R1-3	-18V
-TP2	1A2A1S1-4R-33	
-TP3	J5-43	YIG FM SWEEP
-TP4	1A2S4-1	+18V
-TP4	1A2R1-1	+18V
-TP4	1A4TB3-4	+18V
-TP5	J5-49	YIG FM FILT TUNE
-TP6	1A2E1	GND
1A2A3S1-2R-6	J5-15	SHIELD
1A2A3A2-TP2		SHIELD
1A2A3S1-2R-12	J5-17	0 TO 6 VDC
1A2A3A2-TP1		SHIELD
-TP2	1A2A10J3-3	GND
1A2A3S1-3R-6	J5-13	YIG FILT GAIN
1A2A3A3-TP3		YIG FILT GAIN
1A2A3S1-3R-12	J5-11	YIG OSC GAIN
1A2A3A3-TP3		YIG OSC GAIN
-TP2	1A11J1-22	YIG SWEEP
-TP3		SHIELD
-TP2	1A3J13-15	
-TP3		SHIELDED
1A2A3S1-4F-2	J5-23	+18 VDC
-4R-6	1A14J1-5	DISPLAY SCOPE
-4R-12	1A14J1-4	DISPLAY GAIN IN
1A2A3A4-TP1	1A14J1-3	DISPLAY GAIN OUT
-TP2	1A2A10J3-21	
-TP3	1A2A10J3-33	
1A2A3S1-5F-1	J5-5	BAND 1 VSA
-5F-1	1A13J1-1	
-5F-2	1A3J13-6	BAND 2 ADJ
-5F-2	1A13J1-2	
-5F-3	1A3J13-7	BAND 3 ADJ
-5F-3	1A13J1-3	
-5F-4	1A3J13-8	BAND 4 ADJ
-5F-4	1A13J1-4	
-5F-5	1A13J1-5	BAND 5 ADJ

Table 7-4. Wire Run List (Continued)

From	To	Function
1A2A3S1-5F-6	1A2E1	GND
-5F-7	1A15J1-5	BAND 1 SELECT
-5F-8	1A15J1-3	BAND 2 SELECT
-5F-9	1A15J1-4	BAND 3 SELECT
-5F-10	1A15J1-2	BAND 4 SELECT
-5F-11	1A15J1-1	BAND 5 SELECT
-5F-12	1A2A1S1-6F-32	+18V
-5R-8	1A2A1S1-1F-30	
-6F-11	1A2S3-6	
-6F-11	J5-35	24 VDC BD 5 SEL
-6R-7	J5-29	BAND 1 RELAY
-6R-8	1A3J13-10	
-6R-8	J5-28	BAND 2-5 RELAY
-6R-12	1A13J1-19	BAND GAIN 1
-7F-2	1A2A1S1-5F-32	
-7F-2	1A2A15S1-1	-18V
-7F-3	1A6J1-6	001 OPTION
-7F-3	J5-22	18 VDC
-7F-8	1A14J1-2	SIG CTR OFFSET IN
-7F-9	1A15R3-2	SIG CTR OFFSET
-7R-3	1A13J1-9	BAND GAIN 2
-8F-3	J5-1	YIG CURRENT SENSE
-8F-4	1A2A1S1-3R-23	
-8F-10	1A2A1S1-3F-33	
-8R-1	1A2A1S1-4F-32	
-8R-7	1A11J1-9	MARKER OUT
-8R-8	1A2A2S1-4F-31	
-8R-9	1A2A8J1-9	
-8R-11	1A2A2S1-6R-31	
-9F-3	1A11J1-12	COARSE TUNING
-9F-4	1A2A10J3-23	
-9F-10	1A4TB3-1	+24V
-9F-11	1A2A1S1-3F-11	
-9F-11	1A2A10J3-26	
-9R-1	1A11J1-13	
-9R-3	1A2A1S2-NC1	
-9R-4	1A2A1S1-2R-14	
-9R-6	J5-14	24 VDC BD 5
-9R-8	1A13J1-7	+24V SWITCHED
-9R-9	C1-	
-9R-12	1A2A1S1-1R-15	
1A2A4 IF BANDWIDTH SWITCH		
1A2A4S1-1F-2	1A1E8	+18V
-1F-10	1A17J1-39	I1X3X+
-1F-10	J5-7	1 MHZ FILT ENER
-1F-12	1A2A2S1-1F-24	
-1R-5	J5-8	100 KHZ FILT ENER
-1R-5	1A12J1-18	VIDEO FILTER A
-1R-5	1A17J1-32	I1X2X+
-1R-8	1A2A2S1-1R-22	
-2F-9	1A2A2S1-2R-2	
-2F-11	1A12J1-19	VIDEO FILTER B
-2F-11	1A17J1-34	I1X1X+
-2F-11	J5-32	VIDEO FILTER B
-2R-1	1A12J1-17	VIDEO FILTER C
1A2A4S1-2R-1	1A17J1-3	I1X0X+
-2R-1	J5-33	1 KHZ FILT ENER
* -2R-3	1A22FL1	100 HZ SELECT
-2R-10	1A2A2S1-2F-3	
1A2A4S2-NC1	1A12J1-8	NORM/FILTER VIDEO
1A2A4R1-1	1A12J1-7	VAR VIDEO BW B
R1-3	1A12J1-5	VAR VIDEO BW A
1A2A4S2-W1	1A2A2S1-6F-26	
-W1	1A2A1S2-W2	
1A2A5 VERT SCALE/DIV SWITCH		
1A2A5S1-1F-2	1A17J1-1	AMPLX-
-1F-3	1A17J1-9	AMP2X-
-1F-4	1A17J1-8	AMP5X
-1F-5	1A17J1-7	AMP10X-
-2F-7	1A12J1-6	LIN/LOG, SEL
-3R-2	1A2E1	GND
-2R-1	1A12J1-4	AMPL SEL A
-2R-6	1A12J1-3	AMPL SEL B
-3R-3	1A12J1-24	EXP OFFSET
-3R-6	1A12J1-2	EXP GAIN
-3R-7	1A2S3-4	
-3R-7	1A6J1-7	
1A2A6 SCAN MODE SWITCH		
1A2A6S1-1F-13	1A3J3	EXT TRIGGER
-1F-16	1A12J1-25	VIDEO
-1F-16	1A3J6	VIDEO
-1F-19	1A4TB3-6	8V LINE TRIGGER
-1F-28	1A11J1-20	SCAN MODE TRIGGER
-1R-5	1A11J1-21	SCAN MODE C
-1R-20	1A11J1-16	SCAN MODE B
-1R-32	1A11J1-17	SCAN MODE A
-2F-7	1A2A2S1-3R-26	
-2F-10	1A3J2	EXT SWEEP
-2F-28	1A2A8J1-5	RAMP IN
-2R-32	1A2A8J1-4	RAMP IN
-2F-28	1A11J1-33	RAMP IN
-2F-28	1A3J5	RAMP IN
-2R-28	1A12J1-12	INT BLANKING
-2R-32	1A2E1	GND
-3F-16	1A2R2-2	VIDEO TRIGGER
-3F-28	1A11J1-28	VIDEO TRIGGER
-3R-2	1A1E35	MANUAL-
1A2A6R1-1	1A2A10J3-5	+6 VDC
R1-1	1A2R2E2	
1A2A6S2-NC	1A4TB3-10	+5V

*FOR 100/300 HZ FILTER OPTION

Table 7-4. Wire Run List (Continued)

From	To	Function
1A2A7 CALIBRATE INDICATOR		
1A2A7-2	1A2S4-3	
-3	1A2S5-(-)	
1A2A8 BANDWIDTH PC BOARD		
1A2A8J1-1	1A17J1-5	BIX2X-
-2	1A17J1-6	BIX3X-
-3	1A1E4	+5V
-4	1A2A6S1-2R-32	GND
-5	1A2A6S1-2F-28	RAMP IN
-6		SPARE
-7		SPARE
-8	1A2A2S1-6R-3	
-9	1A2A3S1-8R-9	
-10	1A11J1-2	REF SW PIN
-11	1A11J1-35	LEVEL SHIFT
-12	1A2A2S1-6R-31	
-13	1A2A1S2-W2	UNCAL
-14	1A2A2S1-6F-18	1 MSEC
-15	1A2A2S1-6F-20	.1 MSEC
-16	1A2A2S1-6F-22	.01 MSEC
-17	1A17-40	LUNCL-
-18	1A1E5	+5V
-19	1A17J1-4	BI1X1
-20	1A17J1-2	BI1X0
1A2A9 5 FUNCTION PUSHBUTTON SWITCH		
1A2A9J1-1	1A20J2-1	LRCLL-
-2	1A20J2-2	+5 VDC
-3	1A20J2-3	GND
-5	1A20J2-5	BYPASS-
-6	1A20J2-6	BYPASS+
-7	1A20J2-7	INPUT+
-8	1A20J2-8	INPUT-
-9	1A20J2-9	HOLDX-
-10	1A20J2-10	HOLDX+
-11	1A20J2-11	LINPT-
-12	1A20J2-12	LI-MM-
-15	1A20J2-15	LBYPASS-
-16	1A20J2-16	LHOLD-
-17	1A20J2-17	RECAL-
-18	1A20J2-18	RECAL+
-19	1A20J2-19	I-MEM-
-20	1A20J2-20	I-MEM+
1A2A10 4 FUNCTION PUSHBUTTON SWITCH		
1A2A10J1-1	1A20J1-6	CHAXX-
-2	1A20J1-3	+5 VDC
-3	1A20J1-5	CHBXX-
-4	1A20J1-18	RODIS+
-5	1A20J1-17	SAVEX-
-6	1A20J1-16	RDDIS-
-7	1A20J1-15	LNCHA-
1A2A10J1-8	1A20J1-14	LDSTR-
-9	1A20J1-12	LNCHB-
-10	1A20J1-13	LDISB-
-16	1A20J1-19	SAVEX+
1A2A10J2-1	1A2A12R1-3	
-2	1A2A12R2-3	
-3		SPARE
-4		SPARE
-5	1A2A12CL-2	
-6	1A2A12CL-1	
-7	1A2A12R1-2	
-9	1A2A12R1-1	
-10	1A2A12R2-1	
1A2A10E1	1A2E1	GND
1A2A10J3-2	1A2A15R1-3	
-3	1A2A3A2-TP2	
-4		SPARE
-5	1A2A6R1-1	
-6	1A8-1	+6V REF
-7	1A13J1-14	+6V REF OUT
-8	1A13J1-13	+6V SENSE
-9	1A14J1-8	+6V RET
-10		SPARE
-11	1A2A1S1-3F-31	
-12	1A2A1S1-2F-13	
-16		SPARE
-21	1A2A3A4-TP2	
-23	1A2A3S1-9F-4	TUNING
-24	1A11J1-11	TUNING
-25	1A14J1-1	TUNING VOLT IN
-26	1A3J8	TUNING IN
-27	1A3J9	TUNING OUT
-29	1A14J1-14	-6V REF
-30	1A2A15R2-1	
-32	1A13J1-12	-6V REF
-33	1A2A3A4-TP3	
-34	1A13J1-11	-6V SENSE
-35	1A2A2S2-W1	-6V REF
-36	1A2A3S1-9F-11	24V SWITCHED
1A2A11 FREQUENCY READOUT PC BOARD		
1A2A11J2-1	1A15J2-1	+5V
-2	1A15J2-2	
-3	1A15J2-3	
-4	1A15J2-4	
-5	1A15J2-5	
-6	1A15J2-6	
-7	1A15J2-7	
-8	1A15J2-8	
-9	1A15J2-9	
-10	1A15J2-10	
-11	1A15J2-11	
-12	1A15J2-12	

Table 7-4. Wire Run List (Continued)

From	To	Function
1A2A11J2-13	1A15J2-13	
-14	1A15J2-14	
-16	1A15J2-16	
-18	1A15J2-18	
-25	1A15J2-25	
-26	1A15J2-26	
1A2A11J3-1	1A15J3-1	
-2	1A15J3-2	
-3	1A15J3-3	
-4	1A15J3-4	
-5	1A15J3-5	
-6	1A15J3-6	
-7	1A15J3-7	
-8	1A15J3-8	
-9	1A15J3-9	
-10	1A15J3-10	
-11	1A15J3-11	
-12	1A15J3-12	
-13	1A15J3-13	
-14	1A15J3-14	
-15	1A15J3-15	
-16	1A15J3-16	
-25	1A15J3-25	
-26	1A15J3-26	
1A2A12 TUNER ASSEMBLY		
1A2A12CL-1	1A2A10J2-6	
-2	1A2A10J2-5	
1A2A12E1	1A2J5-39	FINE TUNING A
CASE	1A2J5-38	SHIELD
1A2A12R1-1	1A2A10J2-9	
-2	1A2A10J2-7	WIPER
-3	1A2A10J2-1	CW
1A2A12R2-1	1A2A10J2-10	
-3	1A2A10J2-2	
1A2A13 IF ATTENUATOR		
1A2A13A-1	1A6J3-25	10 dB
-2	1A6J3-24	20 dB
-3	1A6J3-23	30 dB
-4	1A6J3-11	40 dB
-5	1A6J3-12	50 dB
-6	1A6J3-13	60 dB
-7	1A6J3-10	
-8	1A6J3-22	
-9	1A6J3-26	
-10	1A6J3-20	
-C	1A6J3-9	
1A2A13B-1	1A6J3-14	
-2	1A6J3-2	
-3	1A6J3-18	
-4	1A6J3-17	
-5	1A6J3-4	
-6	1A6J3-16	6 dB
-7	1A6J3-3	7 dB
-8	1A6J3-15	8 dB
-9	1A6J3-1	9 dB
-10	1A6J3-21	10 dB
-C	1A6J3-8	GND
1A2A14 RF ATTENUATOR		
1A2A14S1-4	1A6J1-3	60 dB
-5	1A6J1-14	50 dB
-6	1A6J1-1	40 dB
-7	1A6J1-12	30 dB
-8	1A6J1-4	20 dB
-9	1A6J1-11	10 dB
-10	1A2E1	
1A2A15 SIGNAL CENTER ASSEMBLY		
1A2A15R3-1	1A2A10J3-30	-6 VDC
-2	1A2A3S1-7F-9	
-2	1A11J1-23	
-2	J5-27	SIG CENTER
-3	1A2A10J3-2	+6 VDC
1A2A15S1-1	1A2A3S1-7F-2	-18 VDC
-2	J5-2	LOCK DISABLE
1A2A16 BASELINE/CONTRAST ASSEMBLY		
1A2A16R1-1	1A14J1-6	BASELINE CLIP B
-2	1A12J1-9	BASELINE CLIP
-3	1A14J1-7	BASELINE CLIP A
1A2A16R2-1	1A12J1-20	CONTRAST B
-2	1A2A16R2-3	BUS
-3	1A12J1-10	CONTRAST A
1A2A17 CONTROL PANEL ASSEMBLY		
1A2A17J1-1	TO 1A5 CRT CONNECTOR	
-2		
-3		
-4		
-5		
-6		
-7		
-8		
-9		
-10		
-11		
-12		
-13		
-14		

Table 7-4. Wire Run List (Continued)

From	To	Function
1A2R1 FREQUENCY ADJUST		
1A2R1-1	1A2A3A1-TP1	+18 VDC
-2	1A14J1-15	FREQ ADJ
-3	1A2A3A1-TP1	-18 VDC
1A2R2 VIDEO TRIGGER		
1A2R2-E2	1A2A6R1	
-E3	1A2A2S1-W1	
1A2R2-1	1A2R2-E3	
-2	1A2A6S1-3F-16	VIDEO TRIGGER LEVEL
-3	1A2R2-E2	
1A2S1 POWER ON/OFF SWITCH		
1A2S1-2	1A3J16-N	AC IN
-3	1A3J16-J	AC SWITCHED
-5	1A3J16-L	AC IN
-6	1A3J16A	AC SWITCHED
1A2S2 AMPLITUDE ADJUST SWITCH		
1A2S2-C	1A6J4-5	
-1	1A6J4-3	
-2	1A6J4-2	
-4	1A6J4-6	
-8	1A6J4-1	
1A2S3 PRESELECTOR SWITCH		
1A2S3-2	1A2S3-4	
-3	1A2A5S1-3R-7	
-4	1A2E1	
-5	J5-41	24V SWITCHED
-6	1A2A3S1-6R-11	24 VDC
-6	1A2S3-4	24 VDC
-6	1A2S4-4	24 VDC
-6	J5-3	24 VDC
1A2S4 CALIBRATE PUSHBUTTON		
1A2S4-2	1A2A3A1-TP4	18 VDC
-3	1A2A7-2	
-3	J5-24	+18 VDC SWITCHED
-5	1A2S3-6	+24 VDC
-5	1A2S5-4	
1A2A18 RF SWITCH		
1A2A18+	1A2S4-5	
	1A2S5(-)	
1A2A18-	1A2E1	GND
	1A2A7-3	GND

From	To	Function
1A3 REAR PANEL ASSEMBLY		
1A3E1	1A4TB3-10	GND
	1A2E1	GND
	1A3J13-4	GND
1A3J1	1A12J1-11	EXT BLANKING
1A3J2	1A2A6S1-2F-10	EXT SWEEP
1A3J3	1A2A6S1-1F-13	EXT TRIGGER
1A3J4	1A12J1-21	BLANK OUT
1A3J5	1A2A6S1-2F-28	SWEEP OUT
1A3J6	1A2A6S1-1F-16	VIDEO REAR OUT
1A3J8	1A2A10J3-26	TUNING IN
1A3J9	1A2A10J3-27	TUNING OUT
1A3A1 HEAT SINK ASSEMBLY		
1A3A1Q1-B	1A4TB2-8	
-C	1A4TB2-7	
-E	1A4TB2-9	
1A3A1Q2-B	1A4TB2-5	
-C	1A4TB2-4	
-E	1A4TB2-6	
1A3A1Q3-B	1A4TB2-2	
-C	1A4TB2-1	
-E	1A4TB2-3	
1A3B1 FAN		
1A3B1-1	1A4TB1-5	
-2	1A4TB1-3	
1A3J13 AUXILIARY CONNECTOR		
1A3J13-1	1A1E14	SHIELDED
-1	J5-9	LCVCO SWEEP
-3	1A1E20	
-3	J5-34	
-3	1A3J13-4	JUMPER
-4	1A3E1	GND
-4	1A3J13-5	JUMPER
-4	1A3J13-3	JUMPER
-5	1A3J13-4	JUMPER
-5	1A2A3A3-TP3	
-6	1A2A3S1-5F-2	
-7	1A2A3S1-5F-3	
-8	1A2A3S1-5R-5	

Table 7-4. Wire Run List (Continued)

From	To	Function
1A3J13-9	1A4TB3-11	+5 VDC
-10	1A2A3S1-6R-8	
-15	1A2A3A3-TP2	
-16	1A4TB3-4	
-20	1A4TB3-8	
-24	1A4TB3-1	
1A3J14 DATA OUTPUT		
1A3J14-1	1A21J1-1	IN-RC+
-2	1A21J1-2	BDAT7-
-3	1A21J1-3	BDAT8-
-4	1A21J1-4	BSTRB-
-5	1A21J1-5	BBLANK
-6	1A21J1-6	BAD08-
-7	1A21J1-7	BDAT6-
-8	1A21J1-8	BAD04-
-9	1A21J1-9	GND
-10	1A21J1-10	GND
-11	1A21J1-11	BAD06-
-12	1A21J1-12	BAD07-
-13	1A21J1-13	BAD03-
-14	1A21J1-14	BAD09-
-15	1A21J1-15	CA-CB+
-16	1A21J1-16	BDAT5-
-17	1A21J1-17	BDAT2-
-18	1A21J1-18	BDAT3-
-19	1A21J1-19	BDAT4-
-20	1A21J1-20	BDAT1-
-21	1A21J1-21	BAD05-
-22	1A21J1-22	BDAT0-
-23	1A21J1-23	GND
-24	1A21J1-24	BAD00-
-25	1A21J1-25	BAD01-
-26	1A21J1-26	BAD02-
1A3J15 DATA OUTPUT		
1A3J15-1	1A16J2-5	BFR11
-2	1A16J2-14	BFR12
-3	1A16J2-19	BFR14
-4	1A16J2-24	BFR18
-5	1A16J2-6	BFR21
-6	1A16J2-1	BFR22
-7	1A16J2-18	BFR24
-8	1A16J2-23	BFR28
-9	1A16J2-7	BFR31
-10	1A16J2-2	BFR32
-11	1A16J2-17	BFR34
-12	1A16J2-22	BFR38
-13	1A16J2-9	BFR41
-14	1A16J2-4	BFR42
-15	1A16J2-15	BFR44
-16	1A16J2-20	BFR48
-17	1A16J2-8	BFR51
-18	1A16J2-3	BFR52
-19	1A16J2-16	BFR54
-20	1A16J2-21	BFR58
1A3J15-21	1A16J2-13	GND
-22	1A16J2-26	GND
-23	1A16J3-8	BPR01
-24	1A16J3-16	BPR11
-25	1A16J3-7	BPR12
-26	1A16J3-4	BPR14
-27	1A16J3-6	BPR18
-28	1A16J3-2	BPR21
-29	1A16J3-1	BPR22
-30	1A16J3-3	BPR24
-31	1A16J3-5	BPR28
-32	1A16J3-10	GND
-33	1A16J3-9	GND
-34	1A16J3-15	PRFP+
-35	1A17J2-4	BI001
-36	1A17J2-7	BI000
-37	1A17J2-16	BAMP1
-38	1A17J2-15	BAMP0
-39	1A17J2-8	SWXX3
-40	1A17J2-3	SWXX0
-41	1A17J2-5	SWXX1
-42	1A17J2-6	SWXX2
-43	1A17J2-1	GND
-44	1A17J2-2	GND
-45	1A17J2-9	GND
-46	1A17J2-10	GND
-47	1A17J2-11	STXX3
-48	1A17J2-12	STXX2
-49	1A17J2-13	STXX1
-50	1A17J2-14	STXX0
1A3J16 LINE FILTER CONNECTOR		
1A3J16-A	1A2S1-6	AC SWITCHED
-A	1A4TB1-2	AC
-C	1A4TB1-1	
-D	1A4TB1-3	AC
-E	1A4TB1-4	AC
-F	1A4TB1-5	AC
-J	1A2S1-3	AC SWITCHED
-L	1A2S1-5	AC IN
-N	1A2S1-2	AC IN
1A4 POWER SUPPLY		
1A4TB1-1	1A3J16-C	
-2	1A3J16-A	AC
-2	1A5AC-1	DISPLAY
-3	1A3B1-2	FAN RETURN
-3	1A3J16-D	AC
-4	1A3J16-E	AC
-4	1A5AC-2	DISPLAY
-5	1A3B1-1	FAN AC IN
-5	1A3J16-F	AC
1A4TB2-1	1A3A1Q3-C	
-2	1A3A1Q3-B	
-3	1A3A1Q3-E	

Table 7-4. Wire Run List (Continued)

From	To	Function
1A4TB2-4	1A3A1Q2-C	
-5	1A3A1Q2-B	
-6	1A3A1Q2-E	
-7	1A3A1Q1-C	
-8	1A3A1Q1-B	
-9	1A3A1Q1-E	
1A4TB3-1	1A1E16	+24 VDC
-1	1A2A3S1-9F-10	+24 VDC
-1	1A3J13-24	+24 VDC
-2	1A1E24	GND
-2	1A2E1	GND
-3	1A1E7	+18.3 VDC
-3	1A2A3A1-TP4	+18.3 VDC
-3	1A3J13-16	+18.3 VDC
-3	1A6J1-5	+18.3 VDC
-4		SPARE
-5	1A3E1	GND
-6	1A2A6S1-1F-19	8 VAC
-7	1A1E22	AGND
-8	1A1E10	-18.3 VDC
-8	1A2A1S1-5F-32	
-8	1A3J13-20	
-9		SPARE
-10	1A1E21	AGND
-10	1A3E1	GND
-10	1A5GND	
-11	1A3J13-9	+5 VDC
-12	1A1E25	+5 VDC
-12	1A2A6S2	
-12	1A6J1-10	
1A5 DISPLAY ASSEMBLY		
1A5AC-1	1A4TB1-2	
-2	1A4TB1-4	
GND	1A4TB3-10	
X	1A19J1-1	HORIZ
SHIELD	1A19J1-10	
Y	1A19J1-5	VERT
SHIELD	1A19J1-6	
Z	1A1E32	INTNST
1A6 ABSOLUTE POWER		
1A6J-1	1A2A14S1-6	
-3	1A2A14S1-4	
-4	1A2A14S1-8	

From	To	Function
1A6J-5	1A4TB3-4	+18 VDC
* -6	1A2A3S1-7F-3	
-7	1A2A5S1-3R-7	
-10	1A4TB3-12	+5 VDC
-11	1A2A14S1-9	
-12	1A2A14S1-7	
-14	1A2A14S1-5	
1A6J2-2	1A16J1-1	PRF14+
-3	1A16J1-5	PRF18+
-4	1A16J1-12	PRF01+
-5	1A16J1-3	PRFM
-9	1A16J1-8	PRFBK
-12	1A16J1-6	PRF24+
-13	1A16J1 2	PRF21+
-17	1A16J1-7	PRFP
-20	1A16J1-13	PRF11+
-23	1A16J1-11	PRF12+
-25	1A16J1-4	PRF28+
-26	1A16J1-10	PRF22+
1A6J3-1	1A2A13B-9	9
-2	1A2A13B-2	2
-3	1A2A13B-7	7
-4	1A2A13B-5	5
-8	1A2A13B C	GND
-9	1A2A13A-C	GND
-10	1A2A13A-7	70
-11	1A2A13A-4	40
-12	1A2A13A-5	50
-13	1A2A13A-6	60
-14	1A2A13B-1	1 dB
-15	1A2A13B-8	8 dB
-16	1A2A13B-6	6 dB
-17	1A2A13B-4	4 dB
-18	1A2A13B-3	3 dB
-20	1A2A13A-10	100 dB
-21	1A2A13B-10	10 dB
-22	1A2A13A-8	80 dB
-23	1A2A13A-3	30 dB
-24	1A2A13A-2	20 dB
-25	1A2A13A-10	10 dB
-26	1A2A13A-9	90 dB
1A6J4-1	1A2S2-8	AMP ADJ 8
-2	1A2S2-2	AMP ADJ 2
-3	1A2S2-1	AMP ADJ 1
-5	1A2S2-C	+5V
-6	1A2S2-4	AMP ADJ 4
1A8 LOG IF AMPLIFIER		
1A8-1	1A2A10J3-6	+6V REF
-2	1A12J1-1	VIDEO INPUT

*FOR 001 OPTION

Table 7-4. Wire Run List (Continued)

From	To	Function
1A10 RF/IF ASSEMBLY		
1A10P5-1	J18-15	YIG CURRENT SENSE
-2	J18-C	LOCK DISABLE
-3	1A10A3-2	+24 VDC
-4	1A7-2(-)	+24 VDC RETURN
-5	1A10A1-14	BAND 1 VSA
-6	1A10A1-11	BAND 2 VSA
-7	1A10A1-10	1 MHZ FILTER ENERGIZE
-8	1A10A1-9	100 KHZ FILTER ENERGIZE
-9	1A10A6-3	VCO SWEEP IN
-10	1A10A1-17	BAND 5 VSA
-11	J18-B	YIG OSC GAIN
-12	J18-11	+6V TUNE
-13	J18-4	YIG FILTER GAIN
-14	J18-12	+24V BD 5 FULL RANGE
-15	J18-3	YIG FILTER OFFSET
-16	J18-7	LOOP OUTPUT
-17	J18-A	YIG OSC OFFSET
-19	1A10A4-1	MIXER BIAS
-20	1A10A5-9	-18 VDC LOOP
-21	1A10A5-5	+18 VDC LOOP
-22	1A10A26-1	-18V SWITCHED 2060 OSC
-23	1A10A1-15	+18 VDC
-24	1A10A5-10	+18V SWITCHED 100 MHZ OSC
-25	J18-M	+18 VDC
-26	J18-S	VCO BYPASS
-27	J18-2	SIGNAL CENTER
-28	1A10A7-1(+)	BD 2.5 RELAY ENER
-29	1A10A9-1(+)	BD 1 RELAY ENER
-30	1A10A1-12	BD 3 VSA
-31	1A10A1FL-13	BD 4 VSA
-32	1A10A1FL-8	10 KHZ FILTER ENERGIZE
-33	1A10A1FL-7	1 KHZ FILTER ENERGIZE
-34		SHIELD
-35	J18-J	24V BAND 5 SELECT
-36	NC	
-37	1A6-4	
-38	NC	
-39	1A6-5	
-40	NC	
-41	1A10A33-1	24V SWITCHED
-42	NC	
-43	J18-R	YIG FM SWEEP
-44	J18 GND	GND
-45	1A10A5-1	-18V TO COMB
-46	J18-K	-18V SWITCHED
-47	J18-10	+18V SWITCHED
-48	1A10A1FL-16	-18 VDC
-49	J18-14	YIG FM FILTER TUNE
-50	J18-L	-18 VDC
1A10A1 IF PROCESSOR ASSEMBLY		
1A10A1FL-1	1A10A1FL-7	1 KHZ FILT ENER
-2	1A10A1FL-8	10 KHZ FILT ENER
-3	1A10A1FL-9	100 KHZ FILT ENER
1A10A1FL-4	1A10A1FL-10	1 MHZ FILT ENER
-5	1A10A1FL-15	+18 VDC
-5	1A10A5FL-2	
-6	1A10A1FL-16	-18 VDC
-6	1A10A5FL-8	
-7	1A10P5-33	1 KHZ FILT ENER
-7	1A10A1FL-1	
-8	1A10P5-32	10 KHZ FILT ENER
-8	1A10A1FL-2	
-9	1A10P5-8	100 KHZ FILT ENER
-9	1A10A1FL-3	
-10	1A10P5-7	1 MHZ FILT ENER
-10	1A10A1FL-4	
-11	1A10P5-6	BAND 2 VSA
-12	1A10P5-20	BAND 3 VSA
-13	1A10P5-31	BAND 4 VSA
-14	1A10P5-5	BAND 1 VSA
-15	1A10P5-23	+18 VDC
-15	1A10A1FL-5	
-15	1A10A18-1	
-16	1A10P5-48	-18 VDC
-16	1A10A1FL-6	
-16	1A10A18-2	
-17	1A10P5-10	BAND 5 VSA
1A10A2 YIG OSCILLATOR TUNED		
1A10A2-1	J18-N	+18 VDC
-1	1A10A2-9	
-2	J18-GND	GND
-3	1A10A3-2	
-4	1A10A2-2	24V
-4	1A10A3-3	
-5	J18-15	+VCO TUNE
-6	J18-S	-VCO TUNE
-7	J18-9	FM TUNE+
-8	J18-F	FM TUNE-
-9	1A10A2-1	
1A10A3 YIG FILTER		
1A10A3-1	J18-5	YIG FILT TUNE+
-2	1A10A2-3	
-2	1A10P5-3	+24 VDC HEATER
-3	1A10A2-4	
-3	1A10A10(-)	+24V RETURN
-4	J18-13	YIG FILT TUNE+
1A10A4 MIXER BIAS ASSEMBLY		
1A10A4-1	1A10P5-19	MIXER BIAS
1A10A5 LOOP CONTROL ASSEMBLY		
1A10A5-1	1A10P5-45	-18V COMB
-2	1A10A1FL-5	+18 VDC
-2	1A10A6-2	
-3		SPARE
-4		SPARE

Table 7-4. Wire Run List (Continued)

From	To	Function
1A10A5-5	1A10P5-21	+18V
-6	J18-7	LOOP OUTPUT
-7	J18-6	8 HZ OSC DISABLE
-8	1A10A1FL-6	-18 VDC
-8	1A10A6-1	
-9	1A10P5-20	-18 VDC TO LOOP
-GND	J18-F	GND
-10	1A10P5-24	+18 VDC SWITCHED
1A10A6 LOCAL OSCILLATOR ASSEMBLY		
1A10A6FL-3	1A10A5FL-8	-18 VDC
-4	1A10A5FL-2	+18 VDC
1A10A6E1	1A10P5-9	LCVCO GAIN
1A10A6E2	1A10P5-37	FINE TUNE B
1A10A6E3	1A10P5-39	FINE TUNE A
1A10A7 RF SWITCH		
1A10A7-1(+)	1A10P5-28	+24V HI BAND RELAY
-1(+)	1A10A7-2(-)	
-1(+)	1A10A8-1(+)	
-2(-)	1A10P5-4	+24 VDC RETURN
-2(-)	1A10A7-1(+)	
-2(-)	1A10A8-2(-)	
1A10A8 RF SWITCH		
1A10A8-1(+)	1A10A7-1(+)	
-2(-)	1A10A7-2(-)	
-2(-)	1A10A9-2(-)	
1A10A9 RF SWITCH		
1A10A9-1(+)	1A10P5-29	+24V LO BAND RELAY
-1(+)	1A10A9-2(-)	
-1(+)	1A10A10-1(+)	
-2(-)	1A10A8-2(-)	
-2(-)	1A10A9-1(+)	
-2(-)	1A10A10-2(-)	
1A10A10 RF SWITCH		
1A10A10-1(+)	1A10A9-1(+)	
-2(-)	1A10A3-3	
-2(-)	1A10A9-2(-)	
1A10A12 YIG DRIVER ASSEMBLY		
J18-2	P5-27	SIGNAL CENTER
-3	P5-15	YIG FILT OFFSET
-4	P5-13	YIG FILT GAIN
-5	1A10A3-1	YIG FILT TUNE
-6	1A10A5FL-7	8 HZ OSC DISABLE
J18-7	1A10A5FL-6	LOOP OUTPUT
-7	P5-16	LOOP OUTPUT
-8		SPARE
-9	1A10A2-7	FM TUNE
-10	P5-47	+18V FM DRIVER
-11	P5-12	+6V TUNE
-12	P5-14	+24V BD 5 FULL RANGE
-13	1A10A3-4	YIG FILT TUNE
-14	P5-49	YIG OSC FM TUNE
-15	P5-1	YIG CURRENT SENSE
-15	1A10A2-5	
-A	P5-17	YIG OSC OFFSET
-B	P5-11	YIG OSC GAIN
-C	P5-2	LOCK DISABLE
-C	1A10A30-2(-)	GND
-D		CHASSIS GND
-E		CHASSIS GND
-GND	P5-44	GND
-F	1A10A2-8	GND
-H		SPARE
-J	P5-35	24V BAND 5 SELECT
-J	1A10A30-1(+)	
-K	P5-46	-18V SWITCHED (FM)
-L	P5-50	-18 VDC
-M	P5-25	+18 VDC
-N	1A10A2-1	+18 VDC
-P		SPARE
-R	P5-43	YIG FM SWEEP
-S	P5-26	VCO BYPASS VCO TUNE
-S	1A10A2-6	
1A10A18 RF AMPLIFIER ASSEMBLY		
1A10A18-1	1A10A1FL-15	+18 VDC
-1	1A10A31-2	+18 VDC
-2	1A10A1FL-16	-18 VDC
-2	1A10A31-1	18 VDC
1A10A26 OSCILLATOR		
1A10A26-1	P5-22	-18V SWITCHED
-1	1A10A26	GND
1A10A29 RF SWITCH		
1A10A29-1(+)	1A10A30-1(+)	+24V SWITCHED BAND 5 RELAY
-2(-)	1A10A30-2(-)	GND
1A10A30 RF SWITCH		
1A10A30-1	1A10A29-1	+24V SWITCHED
-1(+)	J18-J	
-1(+)	1A10A30-2(-)	
-2	1A10A29-2	
-2	J18-GND	
-2(-)	1A10A20-1(+)	

Table 7-4. Wire Run List (Continued)

From	To	Function
1A10A31 RF AMPLIFIER ASSEMBLY		
1A10A31-1	1A10A18-2	-18 VDC
-2	1A10A18-1	+18 VDC
1A10A33 RF SWITCH		
1A10A33-1(+)	1A10J5-41	+24V SWITCHED
-1(+)	1A10A33-2(-)	
-1(+)	1A10A34-1(+)	+24V SWITCHED
-2(-)	1A10A33-1(+)	
-2(-)	1A10A34-2(-)	
-2(-)	CHASSIS GND	
1A10A34 RF SWITCH		
1A10A34-1	1A10A33-1	24V SWITCHED
-2	1A10A33-2	24V RETURN
1A11 SWEEP GENERATOR		
1A11J1-2	1A2A8J1-10	REF SWEEP IN
NC	1A2A8J1-4	SHIELD
1A11J1-3	J5-18	YIG CURRENT SENSE
-8	1A2A2S1-3F-7	TIME RETRACE
-9	1A2A3S1-8R-7	MARKER OUT
-10	1A2A2S1-3F-11	MSEC RETRACE
-11	1A2A10J3-22	TUNING
-12	1A2A3S1-9F-3	COARSE TUNING
-13	1A2A3S1-9R-1	SCAN WIDTH
-14	1A2A2S1-4R-24	SCAN TIME IN
-15	1A2A2S1-3R-26	REF SWEEP OUT
-16	1A2A6S1-1R-20	SCAN MODE B
-17	1A2A6S1-1R-32	SCAN MODE A
-20	1A2A6S1-1F-28	SCAN MODE INPUT
-21	1A2A6S1-1R-5	SCAN MODE C
-22	1A2A3A3-TP2	YIG SWEEP
-23	1A2A15R1-2	SIGNAL CENTER OFFSET
-24	1A11J1-13	SHIELD GND
-25	1A11J-12	SHIELD GND
-26	1A11J-14	SHIELD GND
-26	1A11J-15	SHIELD GND
-28	1A2A6S1-3F-28	VIDEO TRIGGER
-33	1A2A6S1-2F-28	RAMP IN
-34	1A2A1S2-W1	SCAN WIDTH VERNIER
-35	1A2A8J1-11	LEVEL SHIFT
1A12 PROCESSED VIDEO		
1A12J1-1	1A8-2	VIDEO INPUT
-2	1A2A5S1-3R-6	EXP GAIN
-3	1A2A5S1-2R-6	AMP SELECT B
-4	1A2A5S1-2R-1	AMP SELECT A
-5	1A2A4R1-3	VAR VIDEO B/W A
-6	1A2A5S1-2F-7	LIN/LOG SELECT
1A12J1-7	1A2A4R1-1	VAR VIDEO B/W B
-8	1A2A4S2-NL	NORMAL/FILT VIDEO
-9	1A2A16R1-2	BASELINE CLIP
-10	1A2A16R2-3	CONTRAST A
-11	1A3J1	EXT BLANKING
-12	1A2A6S1-2R-8	INT BLANKING
-13		SPARE
-14		SPARE
-15		SPARE
-16		SPARE
-17	1A2A4S1-2R-1	VIDEO FILT C
-18	1A2A4S1-1R-5	VIDEO FILT A
-19	1A2A4S1-2F-11	VIDEO FILT B
-20	1A2A16R2-1	CONTRAST B
-21	1A3J4	BLANKING OUTPUT
-22		GND
-23		GND
-24	1A2A5S1-3R-3	EXPAND OFFSET
-25	1A2A6S1-1F-16	VIDEO REAR
-26		SHIELD
1A13 REGULATOR BIAS		
1A13J1-1	1A2A3S1-5F-1	BAND 1
-2	1A2A3S1-5F-2	BAND 2 ADJ
-3	1A2A3S1-5F-3	BAND 3 ADJ
-4	1A2A3S1-5F-4	BAND 4 ADJ
-5	1A2A3S1-5F-5	BAND 5 ADJ
-6	J5-19	MIXER BIAS
-7	1A2A3S1-9R-8	+24V SWITCHED
-8	J5-45	COMB ENER B
-9	1A2A3S1-7R-3	BAND GAIN 2
-11	1A2A10J3-34	-6V REF SENSE OUT
-12	1A2A10J3-32	-6V REF OUT
-13	1A2A10J3-8	-6V REF SENSE OUT
-14	1A2A10J3-7	+6V REF OUT
-15	1A2A1S1-3F-31	PHASE LOCK ENABLE
-16	J5-16	LOOP OUTPUT
-19	1A2A3S1-6R-12	BAND GAIN 1
-22	1A13J1-19	SHIELD GND
-28	1A13J1-9	SHIELD GND
-31	1A2A1S1-5R-33	COMB RESET
-32	J5-10	BAND 5 VSA
-33	J5-31	BAND 4 VSA
-34	J5-30	BAND 3 VSA
-35	J5-6	BAND 2 VSA
-36	1A2A1S1-5F-30	COMB ENER A
1A14 DIGITAL DISPLAY NO. 2		
1A14J1-1	1A2A10J3-25	TUNING VOLT IN
-1	1A10J5-12	TUNING VOLT IN
-2	1A2A3S1-7F-8	SIGNAL CENTER OFFSET
-3	1A2A3A4-TP1	DISP GAIN OUT
-4	1A2A3S1-4R-12	DISP GAIN IN
-5	1A2A3S1-4R-6	DISPLAY SLOPE
-6	1A2A16R1-1	BASELINE CLIP B

Table 7-4. Wire Run List (Continued)

From	To	Function
1A14J1-7	1A2A16R1-3	BASELINE CLIP A
-8	1A2A10J3-9	+6V REF
-9		SPARE
-10		SPARE
-11		SPARE
-12	1A14J1-5	SHIELD GND
-13		SPARE
-14	1A2A10J3-29	-6V REF
-15	1A15R1-2	FREQ ADJ
-16	1A14J1-1	GND
1A15 DIGITAL DISPLAY NO. 1		
1A15J1-1	1A2A3S1-5F-11	BAND 5
-2	1A2A3S1-5F-10	BAND 4
-3	1A2A3S1-5F-8	BAND 2
-4	1A2A3S1-5F-9	BAND 3
-5	1A2A3S1-5F-7	BAND 1
1A15J2-1	1A2A11J2-1	+5V
-2	1A2A11J2-2	
-3	1A2A11J2-3	
-4	1A2A11J2-4	
-5	1A2A11J2-5	
-6	1A2A11J2-6	
-7	1A2A11J2-7	
-8	1A2A11J2-8	
-9	1A2A11J2-9	
-10	1A2A11J2-10	
-11	1A2A11J2-11	
-12	1A2A11J2-12	
-13	1A2A11J2-13	
-14	1A2A11J2-14	
-15		SPARE
-16	1A2A11J2-16	
-17		SPARE
-18	1A2A11J2-18	
-19		SPARE
-20		SPARE
-25	1A2A11J2-25	
-26	1A2A11J2-26	
1A15J3-1	1A2A11J3-1	
-2	1A2A11J3-2	
-3	1A2A11J3-3	
-4	1A2A11J3-4	
-5	1A2A11J3-5	
-6	1A2A11J3-6	
-7	1A2A11J3-7	
-8	1A2A11J3-8	
-9	1A2A11J3-9	
-10	1A2A11J3-10	
-11	1A2A11J3-11	
-12	1A2A11J3-12	
-13	1A2A11J3-13	
-14	1A2A11J3-14	

From	To	Function
1A15J3-15	1A2A11J3-15	
-16	1A2A11J3-16	
-25	1A2A11J3-25	
-26	1A2A11J3-26	
1A16 FREQUENCY/POWER		
1A16J1-1	1A6J2-2	PRF14+
-2	1A6J2-13	PRF21+
-3	1A6J2-5	PRFM
-4	1A6J2-25	PRF28+
-5	1A6J2-3	PRF18+
-6	1A6J2-12	PRF24+
-7	1A6J2-17	PRFP
-8	1A6J2-9	PRFBK
-9		SPARE
-10	1A6J2-26	PRF22+
-11	1A6J2-23	PRF12+
-12	1A6J2-4	PRF01
-13	1A6J2-20	PRF11+
1A16J2-1	1A3J15-6	BFR22
-2	1A3J15-10	BFR32
-3	1A3J15-18	BFR52
-4	1A3J15-14	BFR42
-5	1A3J15-1	BFR11
-6	1A3J15-5	BFR21
-7	1A3J15-9	BFR31
-8	1A3J15-17	BFR51
-9	1A3J15-13	BFR41
-10		SPARE
-11		SPARE
-12		SPARE
-13	1A3J15-21	GND
-14	1A3J15-2	BFR12
-15	1A3J15-15	BFR44
-16	1A3J15-19	BFR54
-17	1A3J15-11	BFR34
-18	1A3J15-7	BFR24
-19	1A3J15-3	BFR14
-20	1A3J15-16	BFR48
-21	1A3J15-20	BFR58
-22	1A3J15-12	BFR38
-23	1A3J15-8	BFR28
-24	1A3J15-4	BFR18
-25		SPARE
-26	1A3J15-22	GND
1A16J3-1	1A3J15-29	BPR22
-2	1A3J15-28	BPR21
-3	1A3J15-30	BPR24
-4	1A3J15-26	BPR14
-5	1A3J15-31	BPR28
-6	1A3J15-27	BPR18
-7	1A3J15-25	BPR12
-8	1A3J15-23	BPR01

Table 7-4. Wire Run List (Continued)

From	To	Function
1A16J3-9	1A3J15-33	GND
-10	1A3J15-32	GND
-11		SPARE
-12		SPARE
-13		SPARE
-14		SPARE
-15	1A3J15-34	PRFP+
-16	1A3J15-24	BPR11
1A17 CHARACTER GENERATOR		
1A17J1-1	1A2A5S1-1F-2	AMPLX
-2	1A2A8J1-20	BI1X0
-3	1A2A4S1-2R-1	I1X0X+
-4	1A2A8J1-19	BI1X1
-5	1A2A8J1-1	BI1X2
-6	1A2A8J1-2	BI1X3
-7	1A2A5S1-1F-5	AMP10X
-8	1A2A5S1-1F-4	AMP5X
-9	1A2A5S1-1F-3	AMP2X
-10	1A2A2S1-6F-2	ST100
-11	1A2A4S1-2R-3	I1-3X+
-12	1A2A2S1-6F-4	ST3X0
-13	1A2A2S1-6F-6	ST1X0
-14	1A2A2S1-6F-8	ST3X1
-15	1A2A1S1-7R-23	SW2X8
-16	1A2A1S1-7R-27	SW7X8
-17	1A2A1S1-7R-25	SW5X8
-18	1A2A1S1-7R-1	SW1X3
-19	1A2A1S1-7R-3	SW3X3
-20	1A2A1S1-7R-5	SW1X4
-21		SPARE
-22		KEY
-23	1A2A1S1-7R-21	SW1X8
-24	1A2A1S1-7R-19	SW3X7
-25	1A2A1S1-7R-17	SW1X7
-26	1A2A1S1-7R-9	SW1X5
-27	1A2A1S1-7R-11	SW3X5
-28	1A2A1S1-7R-13	SW1X6
-29	1A2A1S1-7R-15	SW3X6
-30	1A2A1S1-7R-7	SW3X4
-31	1A2A2S1-1R-22	AI1X2+
-32	1A2A4S1-1R-5	I1X2X+
-33	1A2A2S1-2R-2	AI1X1+
-34	1A2A1S1-2F-11	I1X1X+
-35	1A2A2S1-6F-10	ST1X1
-36	1A2A2S1-6F-12	ST3X2
-37	1A2A2S1-6F-14	ST1X2
-38	1A2A2S1-1F-24	AI1X3+
-39	1A2A4S1-1F-10	I1X3X+
-40	1A2A8J1-17	LUNCL
1A17J2-1	1A3J15-43	BUNCL-
-2	1A3J15-44	BI002
-3	1A3J15-40	SWXX0
-4	1A3J15-35	BI001
-5	1A3J15-41	SWXX1
-6	1A3J15-42	SWXX2
1A17J2-7	1A3J15-36	BI000
-8	1A3J15-39	SWXX3
-9	1A3J15-45	GND
-10	1A3J15-46	GND
-11	1A3J15-47	STXX3
-12	1A3J15-48	STXX2
-13	1A3J15-49	STXX1
-14	1A3J15-50	STXX0
-15	1A3J15-38	BAMP0
-16	1A3J15-37	BAMP1
1A18 HORIZONTAL TIMING		
1A18J1-4	1A2A2S1-6F-16	ST3X3-
NC	1A2A2S2-NC2	
1A18J1-5	1A2A2S1-6F-22	ST1X5-
NC	1A2A2S2-NC2	
1A18J1-6	1A2A2S1-6F-18	ST1X3-
-7	1A2A2S1-6F-20	ST1X4-
1A19 DISPLAY TIMING		
1A19J1-1	1A5-X	HORIZ
-2		SPARE
-3		SPARE
-4		SPARE
-5	1A5-Y	VERT
-6	1A5-Y	VERT RET
-7		SPARE
-8		SPARE
-9		SPARE
-10	1A5-X	HORIZ RET
1A20 INTERFACE/LINE GENERATOR		
1A20J1-1		GND
-2		GND
-3	1A2A10J1-2	+5V
-4		SPARE
-5	1A2A10J1-3	CH BXX-
-6	1A2A10J1-1	CH AXX-
-7		MANUAL-
-8		SPARE
-9		SPARE
-10		SPARE
-11		SPARE
-12	1A2A10J1-9	LNCHB
-13	1A2A10J1-10	LDISB
-14	1A2A10J1-8	LDSTR
-15	1A2A10J1-7	LNCHA
-16	1A2A10J1-6	RDDIS
-17	1A2A10J1-5	SAVEX
-18	1A2A10J1-4	RDDIS+
-21	1A2A10J1-16	SAVEX+
1A20J2-1	1A2A9J1-1	LRCLL
-2	1A2A9J1-2	+5V
-3	1A2A9J1-3	GND

Table 7-4. Wire Run List (Continued)

From	To	Function
1A20J2-4		SPARE
-5	1A2A9J1-5	BYPAS
-6	1A2A9J1-6	BYPAS+
-7	1A2A9J1-7	INPUT+
-8	1A2A9J1-8	INPUT
-9	1A2A9J1-9	HOLDX
-10		SPARE
-11	1A2A9J1-11	LINPT
-12	1A2A9J1-12	LI-MM
-13		SPARE
-14		SPARE
-15	1A2A9J1-15	LBYPS
-16	1A2A9J1-16	LHOLD
-17	1A2A9J1-17	
-18	1A2A9J1-18	
-19	1A2A9J1-19	
-20	1A2A9J1-20	HOLDX+
1A21 DATA DIGITIZER		
1A21J1-1	1A3J14-1	
-2	1A3J14-2	
-3	1A3J14-3	
-4	1A3J14-4	
-5	1A3J14-5	
-6	1A3J14-6	
-7	1A3J14-7	
-8	1A3J14-8	
-9	1A3J14-9	
-10	1A3J14-10	
-11	1A3J14-11	
-12	1A3J14-12	
-13	1A3J14-13	
-14	1A3J14-14	
-15	1A3J14-15	
-16	1A3J14-16	
-17	1A3J14-17	
-18	1A3J14-18	
-19	1A3J14-19	
-20	1A3J14-20	
-21	1A3J14-21	
-22	1A3J14-22	
-23	1A3J14-23	
-24	1A3J14-24	
-25	1A3J14-25	
-26	1A3J14-26	
C1 INTERCONNECT		
C1+	1A2A1S1-3R-21	
C1-	1A2A3S1-9R-9	
C1-	J5-26	VCO BYPASS

From	To	Function
J5 CONNECTOR		
J5-1	1A2A3S1-8F-3	YIG CURRENT SENSE
-2	1A2A15S1-2	LOCK DISABLE
-3	1A2S3-1	24 VDC
-4	1A10J5-44	GND
-5	1A2A3S1-5F-1	BAND 1 VSA
-6	1A13J1-35	BAND 2 VSA
-7	1A2A4S1-1F-10	1 MHZ FILT ENER
-8	1A2A4S1-1R-5	100 KHZ FILT ENER
-9	1A3J13-1	LCVCO SWEEP
-10	1A13J1-32	BAND 5 VSA
-11	1A2A3S1-3R-12	YIG OSC GAIN
-12	1A14J1-1	TUNING VOLT IN
-13	1A2A3S1-3R-6	YIG FILT GAIN
-14	1A2A3S1-9R-6	24 VDC
-15	1A2A3S1-2R-6	YIG FILT OFFSET
-16	1A13J1-16	LOOP OUTPUT
-17	1A2A3S1-2R-12	YIG OFFSET
-18	1A11J1-3	YIG CURRENT SENSE
-19	1A13J1-6	MIXER BIAS
-20	1A2A1S1-5F-30	-18 VDC
-21	1A2A1S1-6F-30	+18 VDC
-22	1A2A3S1-7F-3	+18 VDC
-23	1A2A3S1-4F-2	+18 VDC
-23	J5-25	+18 VDC
-24	1A2S4-3	+18 VDC
-25	J5-23	JUMPER
-26	C1-	VCO BYPASS
-27	1A2A15R1-2	SIG CENTER
-28	1A2A3S1-6R-8	BAND 2-5 RELAY
-29	1A2A3S1-6R-7	BAND 1 RELAY
-30	1A13J1-34	BAND 3 VSA
-31	1A13J1-33	BAND 4 VSA
-32	1A2A4S1-2F-11	10 KHZ FILT
-33	1A2A4S1-2R-1	1 KHZ FILT
-34	1A3J13-3	
-35	1A2A3S1-6F-11	24 VDC BD 5
-36		SHIELD
-37	1A2A1S1-2F-15	FINE TUNE B
-38		SHIELD
-39	1A2A12E1	FINE TUNE A
-41	1A2S3-2	24 VDC SWITCHED
-42		SPARE
-43	1A2A3A1-TP3	YIG FM SWEEP
-44	J5-4	GND
-44	1A2E1	GND
-45	1A13J1-8	COMB ENER B
-46	1A2A1S1-5F-12	-18 VDC SWITCHED (FM)
-47	1A2A1S1-6F-12	+18 VDC SWITCHED (FM)
-48	J5-50	-18 VDC
-49	1A2A3A1-TP5	YIG FM FILT TUNE
-50	J5-48	-18 VDC
-50	1A2A1S1-5F-32	-18 VDC

SECTION 8

REPLACEABLE PARTS LIST

8-1. INTRODUCTION

8-2. This section contains the replaceable parts list for the AILTECH 757 Spectrum Analyzer. The parts list contains the reference designation, AILTECH part number, quantity, description, manufacturer's part number, and figure number where part appears.

8-3. LIST OF MAJOR COMPONENTS

8-4. Table 8-1 provides a list of major components for the AILTECH 757 Spectrum Analyzer. The table gives the reference designation, name, and part number of each component.

8-5. REPLACEABLE PARTS LIST

8-6. Table 8-2 provides a list of replaceable parts for the AILTECH 757 Spectrum Analyzer.

8-7. RECOMMENDED SPARE PARTS LIST

8-8. Table 8-3 contains a listing of recommended spare parts that should be maintained in case of a failure of the AILTECH 757 Spectrum Analyzer.

Table 8-1. List of Major Components

Reference Designation	Name	Part Number
1	Spectrum Analyzer 757	296125-1
1A1	Interconnecting Board Assembly	296287-1
1A1A1	Interconnecting Motherboard Assembly	296222-1
1A2	Front Panel Assembly	296158-1
1A2A1	Scan Width Switch Assembly	299475-2
1A2A2	Scan Time Switch Assembly	296256-1
1A2A3	RF Range Switch Assembly	299302-3
1A2A4	IF Bandwidth Switch Assembly	295898-2
1A2A5	Vertical Scale Switch Assembly	295821-2
1A2A6	Scan Mode Switch Assembly	296257-1
1A2A7	Calibrate Indicator Assembly	296310-1
1A2A8	Bandwidth PC Board Assembly	296230-1

Table 8-1. List of Major Components (Continued)

Reference Designation	Name	Part Number
1A2A9	Pushbutton Switch, 5 Function	296232-1
1A2A10	Pushbutton Switch, 4 Function	296234-1
1A2A11	Frequency Readout PC Board Assembly	296026-1
1A2A12	Tuner Assembly	299137-2
1A2A13	IF Attenuator Assembly	295858-2
1A2A14	RF Attenuator Assembly	295835-1
1A2A15	Signal Center Assembly	299735-1
1A2A16	Baseline/Contrast Assembly	299364-1
1A2A17	Control Panel Assembly	296152-1
1A2A18	RF Switch	231079-1
1A3	Rear Panel Assembly	296252-1
1A4	Low Voltage Power Supply	296004-901
1A5	CRT Display Assembly	296154-1
1A6	Absolute Power Board Assembly	295852-2
1A7	Attenuator Fixed	230195-6
1A8	Log IF Amplifier Assembly	296123-1
1A8A1	Log IF Amplifier PC Assembly	296119-1
1A9	Comb Generator	230471-2
1A10	RF/IF Assembly	296225-1
1A10A1	IF Processor Assembly	296236-1
1A10A1A1	Processor PC Board Assembly	299335-3
1A10A1A2	Filter Board Assembly	230302-7
1A10A1A3	Filter Board Assembly	230302-8

Table 8-1. List of Major Components (Continued)

Reference Designation	Name	Part Number
1A10A1A4	Mixer PC Board Assembly	230627-1
1A10A1A5	IF Amplifier PC Board Assembly	230394-1
1A10A2	Yig Oscillator-Tuned	295933-1
1A10A3	Yig Filter	299463-2
1A10A4	Mixer Bias Assembly	230500-1
1A10A5	Loop Control Assembly	296237-1
1A10A5A1	Loop Control PC Board Assembly	299459
1A10A5A2	3.5 MHz Oscillator PC Board Assembly	230410-1
1A10A5A3	Comb Source PC Board Assembly	230402-1
1A10A5A4	100 MHz Oscillator PC Board Assembly	230683-1
1A10A6	Local Oscillator Assembly	296238-1
1A10A6A1	LCVCO Shaper PC Board Assembly	296455
1A10A6A2	LCVCO Oscillator II PC Board Assembly	231089-1
1A10A7	RF Switch	231079-1
1A10A8	RF Switch	231079-1
1A10A9	RF Switch	231079-1
1A10A10	RF Switch	231079-1
1A10A11	Low Pass Filter	230191-1
1A10A12	Yig Driver PC Board Assembly	299395-4
1A10A13	Microwave Mixer	230567-2
1A10A14	Attenuator Fixed	230195-5
1A10A15	Attenuator Fixed	230195-1
1A10A16	Coupler, 6 dB	230194
1A10A17	Harmonic Mixer	230478

Table 8-1. List of Major Components (Continued)

Reference Designation	Name	Part Number
1A10A18	RF Amplifier Assembly	230625
1A10A19	Coupler, 6 dB	230194
1A10A20	227 MHz Bandpass Filter	299374
1A10A21	Isolator 40 dB	230215
1A10A22	Fixed Attenuator	294468
1A10A23	Loop Mixer	230224
1A10A24	Comb Generator	230471-2
1A10A25	Fixed Attenuator	230195-3
1A10A26	2060 MHz Oscillator Assembly	230817
1A10A27	Not Used	
1A10A28	Not Used	
1A10A29	RF Switch	231079-1
1A10A30	RF Switch	231079-1
1A10A31	RF Amplifier Assembly	230625
1A10A32	Heat Sink Assembly Yig Driver	299400-2
1A10A33	RF Switch	231079-1
1A10A34	RF Switch	231079-1
1A10A35	Coupler, 6 dB	230194
1A11	Sweep Generator PC Board Assembly	296200-1
1A12	Processed Video PC Board Assembly	296202-1
1A13	Regulator Bias PC Board Assembly	296204-1
1A14	Digital Display PC Board Assembly No. 2	296206-1
1A15	Digital Display PC Board Assembly No. 1	296208-1

Table 8-1. List of Major Components (Continued)

Reference Designation	Name	Part Number
1A16	Frequency and Power Reference PC Board Assembly	296210-1
1A17	Character Generator and Data Encoder PC Board Assembly	296212-1
1A18	Horizontal Timing PC Board Assembly	296214-1
1A19	Display Timing and Horizontal Output PC Board Assembly	296216-1
1A20	Pushbutton Interface/Line Generator PC Board Assembly	296218-1
1A21	Data Digitizer and Memory Logic No. 6 PC Board Assembly	296220-1

Table 8-2. Replaceable Parts List

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1	296125-1	1	757 SPECTRUM ANALYZER	296125-1	3-1
1A1	296287-1	1	INTERCONNECTING BOARD ASSEMBLY	296287-1	
1A1A1	296222-1	1	INTERCONNECTING MOTHER BOARD	296222-1	7-44
E1	293050-2	35	TERMINAL	60753-2	
E2	293050-2		TERMINAL	60753-2	
E3	293050-2		TERMINAL	60753-2	
E4	293050-2		TERMINAL	60753-2	
E5	293050-2		TERMINAL	60753-2	
E6	293050-2		TERMINAL	60753-2	
E7	293050-2		TERMINAL	60753-2	
E8	293050-2		TERMINAL	60753-2	
E9	293050-2		TERMINAL	60753-2	
E10	293050-2		TERMINAL	60753-2	
E11	293050-2		TERMINAL	60753-2	
E12	293050-2		TERMINAL	60753-2	
E13	293050-2		TERMINAL	60753-2	
E14	293050-2		TERMINAL	60753-2	
E15	293050-2		TERMINAL	60753-2	
E16	293050-2		TERMINAL	60753-2	
E17	293050-2		TERMINAL	60753-2	
E18	293050-2		TERMINAL	60753-2	
E19	293050-2		TERMINAL	60753-2	
E20	293050-2		TERMINAL	60753-2	
E21	293050-2		TERMINAL	60753-2	
E22	293050-2		TERMINAL	60753-2	
E23	293050-2		TERMINAL	60753-2	
E24			NOT USED		
E25			NOT USED		
E26	293050-2		TERMINAL	60753-2	
E27	293050-2		TERMINAL	60753-2	
E28	293050-2		TERMINAL	60753-2	
E29	293050-2		TERMINAL	60753-2	
E30	293050-2		TERMINAL	60753-2	
E31	293050-2		TERMINAL	60753-2	
E32	293050-2		TERMINAL	60753-2	
E33	293050-2		TERMINAL	60753-2	
E34	293050-2		TERMINAL	60753-2	
E35	293050-2		TERMINAL	60753-2	
E36	293050-2		TERMINAL	60753-2	
E37	293050-2		TERMINAL	60753-2	
J1	294408-5	6	CONNECTOR	3VH25/1JDD3	
J2	294408-5		CONNECTOR	3VH25/1JDD3	
J3	294408-5		CONNECTOR	3VH25/1JDD3	
J4	294408-5		CONNECTOR	3VH25/1JDD3	
J5	294408-5		CONNECTOR	3VH25/1JDD3	
J6	294408-6	6	CONNECTOR	3VH35/1JDD3	
J7	294408-6		CONNECTOR	3VH35/1JDD3	
J8	294408-6		CONNECTOR	3VH35/1JDD3	
J9	294408-6		CONNECTOR	3VH35/1JDD3	
J10	294408-6		CONNECTOR	3VH35/1JDD3	
J11	294408-6		CONNECTOR	3VH35/1JDD3	
J12	294408-5		CONNECTOR	3VH25/1JDD3	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A2	296158-1	1	FRONT PANEL ASSEMBLY	296158-1	7-6
CR1	299251-001	2	DIODE	1N4009	
CR2	299251-001		DIODE	1N4009	
E1	990313-2	1	TERMINAL GND	SE26XF02	
E2	293317-2	2	TERMINAL	4870-3-0519	
E3	293317-2		TERMINAL	4870-3-0519	
R1	296251-1	1	FREQ ADJ, RESISTOR, VARIABLE	296251-1	
R2	296251-2	1	VIDEO TRIG, RESISTOR, VARIABLE	296251-2	
R3	299701-821	2	RESISTOR, 820Ω, 1/4W	RC07GF821J	
R4	299701-821		RESISTOR, 820Ω, 1/4W	RC07GF821J	
S1	296249-1	1	POWER ON/OFF, SWITCH	296249-1	
S2	296250-1	1	AMP ADJ, SWITCH	296250-1	
S3	296246-1	1	PRESELECTOR, SWITCH, SLIDE	296246-1	
S4	296247-1	1	CALIBRATE, SWITCH, PUSHBUTTON	296247-1	
S5	231079-1	1	RF SWITCH	231079-1	
W1	296124-1	1	CABLE ASSEMBLY	296124-1	
W2	298505-112	1	CABLE ASSEMBLY	298505-112	
W3	298505-93	1	CABLE ASSEMBLY	298505-93	
1A2A1	299475-2	1	SCAN WIDTH/DIV SWITCH ASSEMBLY	299475-2	7-7
C1	299240-1	1	CAPACITOR, 6.8μF	T368B225M035AS	
E1	990203-1	1	TERMINAL, LUG	990203-1	
R1	299709-219	2	RESISTOR, 100Ω, 1/8W	RN60C1000F	
R2	299709-219		RESISTOR, 100Ω, 1/8W	RN60C1000F	
R3	299709-322	4	RESISTOR, 1K, 1/8W	RN60C1001F	
R4	299709-322		RESISTOR, 1K, 1/8W	RN60C1001F	
R5	299709-322		RESISTOR, 1K, 1/8W	RN60C1001F	
R6	299709-234	1	RESISTOR, 143Ω, 1/8W	RN60C1430F	
R7	299709-285	1	RESISTOR, 442Ω, 1/8W	RN60C4420F	
R8	299709-343	1	RESISTOR, 1.65K, 1/8W	RN60C1651F	
R9	299709-380	1	RESISTOR, 4.02K, 1/8W	RN60C4021F	
R10	299709-459	1	RESISTOR, 24.9K, 1/8W	RN60C2492F	
R11	299709-467	1	RESISTOR, 30.1K, 1/8W	RN60C3012F	
R12	299709-421	1	RESISTOR, 10K, 1/8W	RN60C1002F	
R13	299709-466	1	RESISTOR, 29.4K, 1/8W	RN60C2942F	
R14	299709-417	1	RESISTOR, 9.09K, 1/8W	RN60C9091F	
R15	299709-351	2	RESISTOR, 2K, 1/8W	RN60C2001F	
R16	299709-351		RESISTOR, 2K, 1/8W	RN60C2001F	
R17	299709-322		RESISTOR, 1K, 1/8W	RN60C1001F	
R18	299701-101	1	RESISTOR, 100Ω, 1/4W	RC07GF101J	
R19	299701-102	1	RESISTOR, 1K, 1/4W	RC07GF102J	
S1	299358-2	1	SWITCH, ROTARY	299358-2	
1A2A2	296256-1	1	SCAN TIME/DIV SWITCH ASSEMBLY	296256-1	7-8
C1	296559-103	1	CAPACITOR, 0.01μF, 5%	CK05BX103J	
C2	296560-107	1	CAPACITOR, 100μF, 10%	CS13BC107K	
C3			NOT USED		
C4	293861	1	CAPACITOR, 3.3μF, 5%	M39003/01-5020	
CR1	299251-001	2	DIODE	1N4009	
CR2			NOT USED		
CR3	299251-001		DIODE	1N4009	
E1	990203-1	1	TERMINAL, LUG	990203-1	
R1	299709-620	1	RESISTOR, 1.15 MEG, 1/8W	RN60C1154F	
R2	299709-525	1	RESISTOR, 118K, 1/8W	RN60C1183F	
R3	299709-428	1	RESISTOR, 11.8K, 1/8W	RN60C1182F	
R4	299709-520	1	RESISTOR, 105K, 1/8W	RN60C1053F	
R5	299709-471	1	RESISTOR, 33.2K, 1/8W	RN60C3322F	
R6	299709-56	1	RESISTOR, 332K, 1/8W	RN60C3323F	
R7	299709-518	1	RESISTOR, 100K, 1/8W	RN60C1003F	
R8	299709-473	1	RESISTOR, 34.8K, 1/8W	RN60C3482F	
R9	299702-104	1	RESISTOR, 100K, 1/2W	RC20GF104J	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A2A2R10	299709-424	1	RESISTOR, 10.7K, 1/8W	RN60C1072F	7-8
R11	299709-568	1	RESISTOR, 332K, 1/8W	RN60C3323F	
R12	299709-620	1	RESISTOR, 1.15M, 1/8W	RN60C1154F	
R13	299701-511	1	RESISTOR, 510Ω, 1/4W	RC07GF511J	
S1	296126-1	1	SWITCH, ROTARY	296126-1	
1A2A3	299302-3	1	RF RANGE SWITCH ASSEMBLY	299302-3	7-9
R73	299709-396	1	RESISTOR, 5.49K, 1/8W, 1%	RN60C5491F	
R74	299701-823	1	RESISTOR, 82K, 1/4W, 5%	RC07GF823J	
R75	299701-124	1	RESISTOR, 120K, 1/4W, 5%	RC07GF124J	
R85	299709-421	3	RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R86	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R87	299701-102	1	RESISTOR, 1K, 1/4W, 5%	RC07GF102J	
R92	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R93	299709-391	1	RESISTOR, 4.99K, 1/8W, 1%	RN60C4991F	
R94	299709-668	1	RESISTOR, 2.50K, 1/8W, 1%	RN60C2501F	
R95	299701-472	2	RESISTOR, 4.7K, 1/4W, 1%	RC07GF472F	
R96	299701-432	1	RESISTOR, 4.3K, 1/4W, 5%	RC07GF432J	
R97	299701-472		RESISTOR, 4.7K, 1/4W, 1%	RC07GF472F	
S1	299359-1	1	SWITCH, ROTARY	299359-1	
1A2A3A1	299303-1	1	YIG FM TUNING PC BOARD	299303-1	7-9
C1	299244-1	2	CAPACITOR, .01μF	C023F501C103Z	
C2	299244-1		CAPACITOR, .01μF	C023F501C103Z	
R78	299709-421	3	RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R79	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R80	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R82	299709-351	1	RESISTOR, 2K, 1/8W, 1%	RN60C2001F	
R83	299709-391	1	RESISTOR, 4.99K, 1/8W, 1%	RN60C4991F	
R84	299709-360	1	RESISTOR, 2.49K, 1/8W, 1%	RN60C2491F	
R88	299709-329	1	RESISTOR, 1.18K, 1/8W, 1%	RN60C1181F	
TP1	294243	6	TERMINAL, SOLDER	1558-2-05	
TP2	294243		TERMINAL, SOLDER	1558-2-05	
TP3	294243		TERMINAL, SOLDER	1558-2-05	
TP4	294243		TERMINAL, SOLDER	1558-2-05	
TP5	294243		TERMINAL, SOLDER	1558-2-05	
TP6	294243		TERMINAL, SOLDER	1558-2-05	
Z1	293511	1	INTEGRATED CIRCUIT	SN72741P	
1A2A3A2	295014-2	1	YIG OFFSETS PC BOARD	295014-2	7-9
R22	299709-239	1	RESISTOR, 162Ω, 1/8W, 1%	RN60C1620F	
R23	299745-4	2	RESISTOR, VARIABLE, 100Ω	3009P-1-101	
R24	299709-330	1	RESISTOR, 1.21K, 1/8W, 1%	RN60C1211F	
R25	299709-276	1	RESISTOR, 3.74Ω, 1/8W, 1%	RN60C3740F	
R26	299745-6	8	RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R27	299709-360	1	RESISTOR, 2.49K, 1/8W, 1%	RN60C2491F	
R28	299709-280	1	RESISTOR, 412Ω, 1/8W, 1%	RN60C4120F	
R29	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R30	299709-357	1	RESISTOR, 2.32K, 1/8W, 1%	RN60C2321F	
R31	299709-230	1	RESISTOR, 130Ω, 1/8W, 1%	RN60C1300F	
R32	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R33	299709-362	2	RESISTOR, 2.61K, 1/8W, 1%	RN60C2611F	
R34	299709-222	1	RESISTOR, 107Ω, 1/8W, 1%	RN60C1070F	
R35	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R36	299709-362		RESISTOR, 2.61K, 1/8W, 1%	RN60C2611F	
R37	299709-288	1	RESISTOR, 475Ω, 1/8W, 1%	RN60C4750F	
R38	299745-4		RESISTOR, VARIABLE, 100Ω	3009P-1-101	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A2A3A2R39	299709-333	1	RESISTOR, 1.3K, 1/8W, 1%	RN60C1301F	7-9
R40	299709-305	1	RESISTOR, 681Ω, 1/8W, 1%	RN60C6810F	
R41	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R42	299709-368	1	RESISTOR, 3.01K, 1/8W, 1%	RN60C3011F	
R43	299709-347	1	RESISTOR, 1.82K, 1/8W, 1%	RN60C1821F	
R44	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R45	299709-357	1	RESISTOR, 2.32K, 1/8W, 1%	RN60C2321F	
R46	299709-389	1	RESISTOR, 4.75K, 1/8W, 1%	RN60C4751F	
R47	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R48	299709-350	1	RESISTOR, 1.96K, 1/8W, 1%	RN60C1961F	
R49	299709-405	1	RESISTOR, 6.81K, 1/8W, 1%	RN60C6811F	
R50	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R51	299709-350		RESISTOR, 1.96K, 1/8W, 1%	RN60C1961F	
TP1	294243	2	TERMINAL, SOLDER	1558-2-05	
TP2	294243		TERMINAL, SOLDER	1558-2-05	
1A2A3A3	299304-1	1	YIG GAINS PC BOARD	299304-1	7-9
R4	299709-351	2	RESISTOR, 2K, 1/8W, 1%	RN60C2001F	
R5	299709-351		RESISTOR, 2K, 1/8W, 1%	RN60C2001F	
R6	299709-322	4	RESISTOR, 1K, 1/8W, 1%	RN60C1001F	
R7	299709-322		RESISTOR, 1K, 1/8W, 1%	RN60C1001F	
R8	299709-322		RESISTOR, 1K, 1/8W, 1%	RN60C1001F	
R9	299709-322		RESISTOR, 1K, 1/8W, 1%	RN60C1001F	
R13	299709-368	4	RESISTOR, 3.01K, 1/8W, 1%	RN60C3011F	
R14	299745-6	4	RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R15	299709-346	4	RESISTOR, 1.78K, 1/8W, 1%	RN60C1781F	
R16	299709-368		RESISTOR, 3.01K, 1/8W, 1%	RN60C3011F	
R17	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R18	299709-346		RESISTOR, 1.78K, 1/8W, 1%	RN60C1781F	
R19	299709-368		RESISTOR, 3.01K, 1/8W, 1%	RN60C3011F	
R20	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R21	299709-346		RESISTOR, 1.78K, 1/8W, 1%	RN60C1781F	
R89	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R90	299709-368		RESISTOR, 3.01K, 1/8W, 1%	RN60C3011F	
R91	299709-346		RESISTOR, 1.78K, 1/8W, 1%	RN60C1781F	
TP1	294243	2	TERMINAL, SOLDER	1558-2-05	
TP2	294243		TERMINAL, SOLDER	1558-2-05	
1A2A3A4	231028-2	1	DIGITAL DISPLAY PC BOARD	231028-2	7-9
R10	299745-6	5	RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R11	299709-547	1	RESISTOR, 200K, 1/8W, 1%	RN60C2003F	
R12	299709-376	5	RESISTOR, 3.65K, 1/8W, 1%	RN60C3651F	
R52	299745-8	2	RESISTOR, VARIABLE, 2K	3009P-1-202	
R53	299709-398	1	RESISTOR, 5.76K, 1/8W, 1%	RN60C5761F	
R54	299745-9	1	RESISTOR, VARIABLE, 5K	3009P-1-502	
R55	299709-418	1	RESISTOR, 9.31K, 1/8W, 1%	RN60C9311F	
R56	299745-10	2	RESISTOR, VARIABLE, 10K	3009P-1-103	
R57	299709-409	1	RESISTOR, 7.5K, 1/8W, 1%	RN60C7501F	
R58	299745-10		RESISTOR, VARIABLE, 10K	3009P-1-103	
R59	299709-454	1	RESISTOR, 22.1K, 1/8W, 1%	RN60C2212F	
R60	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R61	299709-523	1	RESISTOR, 113K, 1/8W, 1%	RN60C1133F	
R62	299709-376		RESISTOR, 3.65K, 1/8W, 1%	RN60C3651F	
R63	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R64	299709-506	1	RESISTOR, 75K, 1/8W, 1%	RN60C7502F	
R65	299709-376		RESISTOR, 3.65K, 1/8W, 1%	RN60C3651F	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A2A3A4R66	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	7-9
R67	299709-492	1	RESISTOR, 53.6K, 1/8W, 1%	RN60C5362F	
R68	299709-376		RESISTOR, 3.65K, 1/8W, 1%	RN60C3651F	
R69	299745-6		RESISTOR, VARIABLE, 500%	3009P-1-501	
R70	299709-469	1	RESISTOR, 31.6K, 1/8W, 1%	RN60C3162F	
R71	299709-376		RESISTOR, 3.65K, 1/8W, 1%	RN60C3651F	
R72	299745-8		RESISTOR, VARIABLE, 2K	3009P-1-202	
R81	299709-403	1	RESISTOR, 6.49K, 1/8W, 1%	RN60C6491F	
TP1	294243	3	TERMINAL, SOLDER	1558-2-05	
TP2	294243		TERMINAL, SOLDER	1558-2-05	
TP3	294243		TERMINAL, SOLDER	1558-2-05	
1A2A4	295898-2	1	IF BANDWIDTH SWITCH ASSEMBLY	295898-2	7-10
S1	295829-1	1	ROTARY SWITCH	295829-1	
1A2A5	295821-2	1	VERTICAL SCALE SWITCH ASSEMBLY	295821-2	7-11
R1	299709-150	1	RESISTOR, 45.3Ω, 1/8W	RN60C45R3F	
R2	299709-252	1	RESISTOR, 221Ω, 1/8W	RN60C2210F	
S1	295806-1	1	SWITCH, ROTARY	295806-1	
1A2A6	296257-1	1	SCAN MODE SWITCH ASSEMBLY	296257-1	7-12
C1	293721	1	CAPACITOR, 430μF,8V	109D437X008T2	
E1	990203-1	2	TERMINAL, LUG	990203-1	
E2	990203-1		TERMINAL, LUG	990203-1	
R2	299701-201	1	RESISTOR, 200Ω, 1/4W	RC07GF201J	
S1	296023-1	1	SWITCH, ROTARY	296023-1	
1A2A7	296310-1	1	CALIBRATE INDICATOR ASSEMBLY	296310-1	
CR1	296248-3	1	DIODE	HLMP-1301-4684	
E1	293320-2	3	TERMINAL, STUD	293320-2	
E2	293320-2		TERMINAL, STUD	293320-2	
E3	293320-2		TERMINAL, STUD	293320-2	
R10	299701-132	1	RESISTOR, 1.3K, 1/4W	RC07GF132J	
1A2A8	296230-1	1	BANDWIDTH PC BOARD ASSEMBLY	296230-1	7-13
CR1	296248-2	6	DIODE, LED	1401(-4584)	
CR2	296248-2		DIODE, LED	1401(-4584)	
CR3	296248-3	1	DIODE, LED	1501(4984)	
CR4	299251-901	4	DIODE	1N4009	
CR5	299251-901		DIODE	1N4009	
CR6	299251-901		DIODE	1N4009	
CR7	299251-901		DIODE	1N4009	
CR8	296248-2		DIODE	1401(-4584)	
CR9	296248-2		DIODE	1401(-4584)	
CR10	296248-2		DIODE	1401(-4584)	
CR11	296248-2		DIODE	1401(-4584)	
J1	299934-3	1	CONNECTOR, HEADER, 20 PIN	1-87227-0	
R1	299700-241	7	RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R2	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R3	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R4	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R5	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R6	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R7	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
S1	296288-1	1	SWITCH, SLIDE, 4PDT	MSS4200	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A2A9	296232-1	1	PUSHBUTTON SWITCH ASSEMBLY, 5 FUNCTION	296232-1	7-14
CR1	296258-1	5	DIODE, LED	296258-1	
CR2	296258-1		DIODE, LED	296258-1	
CR3	296258-1		DIODE, LED	296258-1	
CR4	296258-1		DIODE, LED	296258-1	
CR5	296258-1		DIODE, LED	296258-1	
J1	299934-3	1	CONNECTOR, HEADER, 20 PIN	1-87227-0	
R1	299700-241	5	RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R2	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R3	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R4	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R5	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
S1	296247-3	5	SWITCH, PUSHBUTTON	PB17-5	
S2	296247-3		SWITCH, PUSHBUTTON	PB17-5	
S3	296247-3		SWITCH, PUSHBUTTON	PB17-5	
S4	296247-3		SWITCH, PUSHBUTTON	PB17-5	
S5	296247-3		SWITCH, PUSHBUTTON	PB17-5	
1A2A10	296234-1	1	PUSHBUTTON SWITCH ASSEMBLY, 4 FUNCTION	296234-1	7-15
C1	293721	2	CAPACITOR, 430μF,8V	109D437X0008T2	
C2	115307-10	2	CAPACITOR, 100μF	TE1211	
C3	293721		CAPACITOR, 430μF,8V	109D437X0008T2	
C4	115307-10		CAPACITOR, 100μF	TE1211	
E1	293050-1	1	TERMINAL	61137-1	
J1	299935-1	1	CONNECTOR, HEADER, 16 PIN	87230-8	
J2	294213-1	1	CONNECTOR, HEADER, 10 PIN	87230-5	
J3	294454-1	1	CONNECTOR, HEADER, 36 PIN	87230-8	
R1	299700-241	4	RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R2	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R3	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R4	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R5	299702-560	2	RESISTOR, 56Ω, 1/2W	RC20GF560J	
R6	299702-560		RESISTOR, 56Ω, 1/2W	RC20GF560J	
S1	296247-2	4	SWITCH, PUSHBUTTON	296247-2	
S2	296247-2		SWITCH, PUSHBUTTON	296247-2	
S3	296247-2		SWITCH, PUSHBUTTON	296247-2	
S4	296247-2		SWITCH, PUSHBUTTON	296247-2	
1A2A11	296026-1	1	FREQUENCY READOUT PC BOARD ASSEMBLY	296026-1	7-16
J2	299932	2	CONNECTOR, HEADER, 26 PIN	1-87227-3	
J3	299932		CONNECTOR, HEADER, 26 PIN	1-87227-3	
XZ1	294573-1	5	SOCKET, 14 PIN	C931410	
XZ2	294573-1		SOCKET, 14 PIN	C931410	
XZ3	294573-1		SOCKET, 14 PIN	C931410	
XZ4	294573-1		SOCKET, 14 PIN	C931410	
XZ5	294573-1		SOCKET, 14 PIN	C931410	
Z1	293212-1	5	LED DISPLAY	5082-7730	
Z2	293212-1		LED DISPLAY	5082-7730	
Z3	293212-1		LED DISPLAY	5082-7730	
Z4	293212-1		LED DISPLAY	5082-7730	
Z5	293212-1		LED DISPLAY	5082-7730	
1A2A12	299137-2	1	TUNER ASSEMBLY	299137-2	7-17
CL1	293300	2	TERMINAL	011-2000-000-479	
CL2	293300		TERMINAL	011-2000-000-479	
CR1	299251-1	2	DIODE	1N4009	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A2A12CR2	299251-1		DIODE	1N4009	7-17
E1	293317	1	TERMINAL	4862-1-0519	
P1	299946	1	CONNECTOR, 10 PIN	1-86148-2	
R1	299793	1	POTENTIOMETER, 5K	3400S-1-502	
R2	294753-2	1	POTENTIOMETER, 5K	8146-R5K-L.25SS	
R3	299701-512	1	RESISTOR, 5.1K, 1/4W	RC07GF512J	
1A2A13	295858-3	1	IF ATTENUATOR ASSEMBLY	295858-3	7-18
P3	294410	1	CONNECTOR	86905-1	
W1	294881		CABLE	455-044-26	
1A2A14	295835-2	1	RF ATTENUATOR ASSEMBLY	295835-2	7-19
MP1	293648	1	SWITCH, ROTARY	71B36-01-1-10N-F	
MP2	294179	1	COUPLING, FLEXIBLE	A-201-5 TINY MITE	
MP3	295668	1	SHAFT	295668	
1A2A15	299735-1	1	SIGNAL CENTER ASSEMBLY	299735-1	7-6
1A2A16	299364-1	1	BASELINE/CONTRAST ASSEMBLY	299364-1	7-6
1A2A17	296152-1	1	CONTROL PANEL ASSEMBLY	296152-1	7-6
1A2A18	231079-1	1	RF SWITCH	919C74700	7-6
1A3	296252-1	1	REAR PANEL ASSEMBLY	296252-1	3-2
B1	294977-1	1	FAN, AXIAL	M747	
FL1	294695	1	FILTER, LINE	6J4	
J1	294336	8	CONNECTOR, BNC	UG1094U/Z	
J2	294336		CONNECTOR, BNC	UG1094U/Z	
J3	294336		CONNECTOR, BNC	UG1094U/Z	
J4	294336		CONNECTOR, BNC	UG1094U/Z	
J5	294336		CONNECTOR, BNC	UG1094U/Z	
J6	294336		CONNECTOR, BNC	UG1094U/Z	
J7	293063	1	HOLE PLUG	653	
J8	294336		CONNECTOR, BNC	UG1094U/Z	
J9	294336		CONNECTOR, BNC	UG1094U/Z	
J10	298505-115	1	CABLE ASSEMBLY		
J11			NOT USED		
J12	298505-117	1	CABLE ASSEMBLY	250-3953	
MP1	294947	1	PLUG AND CORD	16-415	
1A3A1	296004-902	1	HEAT SINK ASSEMBLY	296004-902	3-2
1A4	296004-901	1	LOW VOLTAGE POWER SUPPLY	296004-901	7-20
C1		1	CAPACITOR, 14K, 20V	CGS1434020R3L3PH	
C2		2	CAPACITOR, 3700, 35V	CGS3724035N3L3PS	
C3			CAPACITOR, 3700, 35V	CGS3724035N3L3PS	
C5		1	CAPACITOR, 2K, 60V	CGS2024060N3L3PS	
Q5		1	TRANSISTOR	TIP-121	
S1		1	SWITCH, THERMAL	SW701	
T1		1	TRANSFORMER	T1213A	
TB1		1	TERMINAL BLOCK, 6 PIN	6003/4ST-6	
TB2		1	TERMINAL BLOCK, 9 PIN	1031-9	
1A4A1		1	PC BOARD	218A	7-20
C6		8	CAPACITOR, .01, 80V		
C7			CAPACITOR, .01, 80V		

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A4A1C8		4	CAPACITOR, TANTALUM 15, 20V		7-20
C9		1	CAPACITOR, AXIAL 100, 16V		
C10			CAPACITOR, .01, 80V		
C11			CAPACITOR, .01, 80V		
C12			CAPACITOR, TANTALUM 15, 20V		
C13		2	CAPACITOR, AXIAL 22, 25V		
C14			CAPACITOR, .01, 80V		
C15			CAPACITOR, .01, 80V		
C16			CAPACITOR, TANTALUM 15, 20V		
C17			CAPACITOR, AXIAL 22, 25V		
C18			CAPACITOR, .01, 80V		
C19			CAPACITOR, .01, 80V		
C20			CAPACITOR, TANTALUM 15, 20V		
C21			CAPACITOR, AXIAL 22, 40V		
C22			CAPACITOR, .1, 25V		
C23			CAPACITOR, TANTALUM 3.3, 15V		
C24			CAPACITOR, TANTALUM 3.3, 15V		
CR18		1	DIODE, ZENER	1N749A	
CR19		8	DIODE	1N4004	
CR20			DIODE	1N4004	
CR21		1	DIODE, ZENER	1N967B	
CR22			DIODE	1N4004	
CR23			DIODE	1N4004	
CR24			DIODE, ZENER	1N967B	
CR25			DIODE	1N4004	
CR26			DIODE	1N4004	
CR27		1	DIODE, ZENER	1N970A	
CR28			DIODE	1N4004	
CR29			DIODE	1N4004	
A4Q1		3	TRANSISTOR	2N6385	
Q2	294131	1	TRANSISTOR	2N3053	
Q3			TRANSISTOR	2N6385	
Q4			TRANSISTOR	2N6385	
R1			RESISTOR		
R2		2	RESISTOR, 4.7K		
R3		5	RESISTOR, 1K, 1/4W		
R4		4	RESISTOR, 22K, 1/4W		
R5			RESISTOR, 1K, 1/4W		
R6			RESISTOR		
R7		1	RESISTOR, 0.1Ω, 3W		
R8			RESISTOR, 2.2K, 1/4W		
R9		7	RESISTOR, 2.2K, 1/4W		
R10		4	RESISTOR, 3.01K		
R11		8	POTENTIOMETER, 1K	PT10H2.5	
R12		1	RESISTOR, 866Ω		
R13			RESISTOR, 4.7K, 1/4W		
R14			POTENTIOMETER, 1K	PT10H2.5	
R15		1	RESISTOR, 2.7K, 1/4W		
R16		4	RESISTOR, 470Ω, 1/4W		
R17			RESISTOR		
R18		3	RESISTOR, 10K, 1/4W		
R19		1	RESISTOR, 270Ω, 1/4W		
R20			RESISTOR, 22K, 1/4W		
R21			RESISTOR, 1K, 1/4W		
R22		1	RESISTOR, 0.2Ω, 3W		

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A4A1A4R23			RESISTOR		7-20
R24		2	RESISTOR, 4.75K		
R25			POTENTIOMETER, 1K	PT10H2.5	
R26			RESISTOR, 3.01K		
R27		2	RESISTOR, 13.2K		
R28			POTENTIOMETER, 1K	PT10H2.5	
R29		3	RESISTOR, 1.5K, 1/4W		
R30			RESISTOR, 470Ω		
R31			RESISTOR		
R32		3	RESISTOR, 10K, 1/4W		
R33			RESISTOR, 2.2K, 1/4W		
R34			RESISTOR, 22K, 1/4W		
R35			RESISTOR, 1K, 1/4W		
R36			RESISTOR, 0.3Ω, 3W		
R37			RESISTOR		
R38			RESISTOR, 4.75K		
R39			POTENTIOMETER, 1K	PT10H2.5	
R40			RESISTOR, 3.01K		
R41			RESISTOR, 13.2K		
R42			POTENTIOMETER, 1K	PT10H2.5	
R43			RESISTOR, 1.5K, 1/4W		
R44			RESISTOR, 470Ω		
R45			RESISTOR, 10K, 1/4W		
R46			RESISTOR		
R47			RESISTOR, 22K, 1/4W		
R48			RESISTOR, 1K, 1/4W		
R49			RESISTOR		
R50			RESISTOR, 47Ω, 1/4W		
R51			RESISTOR, 0.5Ω, 3W		
R52			RESISTOR, 6.34K		
R53			POTENTIOMETER, 1K	PT10H2.5	
R54			RESISTOR, 3.01K		
R55			RESISTOR, 15K, 1/4W		
R56			POTENTIOMETER, 1K	PT10H2.5	
R57			RESISTOR, 1.5K, 1/4W		
R58			RESISTOR, 470Ω		
R59			RESISTOR, 2.2K, 1/4W		
R60			RESISTOR, 2.2K, 1/4W		
R61			RESISTOR, 2.2K, 1/4W		
R62			RESISTOR		
TB3		1	TERMINAL BLOCK, 12 PINS	2062-12	
VR1		4	SCR	S2006LS3	
VR2			SCR	S2006LS3	
VR3			SCR	S2006LS3	
VR4			SCR	S2006LS3	
Z1		4	INTEGRATED CIRCUIT	723HC	
Z2			INTEGRATED CIRCUIT	723HC	
Z3			INTEGRATED CIRCUIT	723HC	
Z4			INTEGRATED CIRCUIT	723HC	
Z5		4	INTEGRATED CIRCUIT	MC3423P	
Z6			INTEGRATED CIRCUIT	MC3423P	
Z7			INTEGRATED CIRCUIT	MC3423P	
Z8			INTEGRATED CIRCUIT	MC3423P	
1A4A2		1	PC BOARD	217	7-20

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A4A1A4R23			RESISTOR		7-20
R24		2	RESISTOR, 4.75K		
R25			POTENTIOMETER, 1K	PT10H2.5	
R26			RESISTOR, 3.01K		
R27		2	RESISTOR, 13.2K		
R28			POTENTIOMETER, 1K	PT10H2.5	
R29		3	RESISTOR, 1.5K, 1/4W		
R30			RESISTOR, 470Ω		
R31			RESISTOR		
R32		3	RESISTOR, 10K, 1/4W		
R33			RESISTOR, 2.2K, 1/4W		
R34			RESISTOR, 22K, 1/4W		
R35			RESISTOR, 1K, 1/4W		
R36			RESISTOR, 0.3Ω, 3W		
R37			RESISTOR		
R38			RESISTOR, 4.75K		
R39			POTENTIOMETER, 1K	PT10H2.5	
R40			RESISTOR, 3.01K		
R41			RESISTOR, 13.2K		
R42			POTENTIOMETER, 1K	PT10H2.5	
R43			RESISTOR, 1.5K, 1/4W		
R44			RESISTOR, 470Ω		
R45			RESISTOR, 10K, 1/4W		
R46			RESISTOR		
R47			RESISTOR, 22K, 1/4W		
R48			RESISTOR, 1K, 1/4W		
R49			RESISTOR		
R50			RESISTOR, 47Ω, 1/4W		
R51			RESISTOR, 0.5Ω, 3W		
R52			RESISTOR, 6.34K		
R53			POTENTIOMETER, 1K	PT10H2.5	
R54			RESISTOR, 3.01K		
R55			RESISTOR, 15K, 1/4W		
R56			POTENTIOMETER, 1K	PT10H2.5	
R57			RESISTOR, 1.5K, 1/4W		
R58			RESISTOR, 470Ω		
R59			RESISTOR, 2.2K, 1/4W		
R60			RESISTOR, 2.2K, 1/4W		
R61			RESISTOR, 2.2K, 1/4W		
R62			RESISTOR		
TB3		1	TERMINAL BLOCK, 12 PINS	2062-12	
VR1		4	SCR	S2006LS3	
VR2			SCR	S2006LS3	
VR3			SCR	S2006LS3	
VR4			SCR	S2006LS3	
Z1		4	INTEGRATED CIRCUIT	723HC	
Z2			INTEGRATED CIRCUIT	723HC	
Z3			INTEGRATED CIRCUIT	723HC	
Z4			INTEGRATED CIRCUIT	723HC	
Z5		4	INTEGRATED CIRCUIT	MC3423P	
Z6			INTEGRATED CIRCUIT	MC3423P	
Z7			INTEGRATED CIRCUIT	MC3423P	
Z8			INTEGRATED CIRCUIT	MC3423P	
1A4A2		1	PC BOARD	217	7-20

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A4A2C4		1	CAPACITOR, AXIAL 220, 25V		7-20
CR1		4	DIODE	MR754	
CR2			DIODE	MR754	
CR3			DIODE	MR754	
CR4			DIODE	MR754	
CR5		8	DIODE	MA4C5	
CR6			DIODE	MA4C5	
CR7			DIODE	MA4C5	
CR8			DIODE	MA4C5	
CR9			DIODE	MA4C5	
CR10			DIODE	MA4C5	
CR11			DIODE	MA4C5	
CR12			DIODE	MA4C5	
CR13		1	RECTIFIER	B376-20	
CR14		4	DIODE	BA5C5	
CR15			DIODE	BA5C5	
CR16			DIODE	BA5C5	
CR17			DIODE	BA5C5	
1A4	296490-1	1	LOW VOLTAGE POWER SUPPLY	296490-1	7-20-A
C1		1	CAPACITOR, 16K μF, 15V	409-169-32	
C2		1	CAPACITOR, 5.1K μF, 40V	163-518-32	
CR1		1	BRIDGE, RECTIFIER	643-002-54	
CR2		1	RECTIFIER, CT, 100V	705-002-54	
CR3		1	RECTIFIER, BRIDGE	1574-002-54	
Q4		1	TRANSISTOR, 2N6055	1057-000-62	
R1		1	RESISTOR, 0.12Ω, 5W	897-R12-42	
R2		1	RESISTOR, 0.33Ω, 5W	897-R33-42	
R3		1	RESISTOR, 0.27Ω, 5W	897-R27-42	
S1		1	THERMOSTAT	413-000-81	
TB1		1	TERMINAL BOARD, 6 POSITION	2873-006-86	
TB2		1	TERMINAL BOARD, 9 POSITION	2872-009-86	
TB3		1	TERMINAL BOARD, 12 POSITION	2874-012-86	
T1		1	TRANSFORMER	2373-000-20	
1A4A1		1	LOW VOLTAGE POWER SUPPLY PC BOARD	2425-000-90	
C5		5	CAPACITOR, 0.01μF, 100VDC	1127-103-34	
C11		1	CAPACITOR, 100μF, 16VDC	513-107-31	
C12		1	CAPACITOR, 200pF, 500VDC	243-221-34	
C13		1	CAPACITOR, 100μF, 35VDC	712-107-31	
C14		4	CAPACITOR, 1μF, 35VDC	156-105-31	
C15			CAPACITOR, 0.01μF, 100VDC	1127-103-34	
C16		1	CAPACITOR, 1.7K μF, 50VDC	157-178-31	
C17		1	CAPACITOR, 3.7K μF, 40VDC	1143-378-31	
C18		1	CAPACITOR, 10μF, 25VDC	696-106-31	
C19		1	CAPACITOR, 1ηF, 500VDC	243-102-34	
C20			CAPACITOR, 1μF, 35VDC	156-105-31	
C21		1	CAPACITOR, 330μF, 16VDC	513-337-31	
C22			CAPACITOR, 0.01μF, 100VDC	1127-103-34	
C23		2	CAPACITOR, 2.2ηF, 500VDC	243-222-34	
C24			CAPACITOR, 1μF, 35VDC	156-105-31	
C25		2	CAPACITOR, 220μF, 25VDC	696-227-31	
C26			CAPACITOR, 0.01μF, 100VDC	1127-103-34	
C27			CAPACITOR, 1μF, 35VDC	156-105-31	
C28			CAPACITOR, 2.2ηF, 500VDC	243-222-34	
C29			CAPACITOR, 220μF	696-227-31	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A4A1C30			CAPACITOR, 0.01μF, 100VDC	1127-103-34	7-20-A
CR4		5	DIODE, 1N4002	132-002-51	
CR5			DIODE, 1N4002	132-002-51	
CR6			DIODE, 1N4002	132-002-51	
CR7			DIODE, 1N4002	132-002-51	
CR8			DIODE, 1N4002	132-002-51	
Q5		4	SCR, C123F	861-001-53	
Q6			SCR, C123F	861-001-53	
Q7		2	TRANSISTOR, 2N2905	849-000-61	
Q8			SCN, C123F	861-001-53	
Q9			TRANSISTOR, 2N2905	849-000-61	
Q10			SCR, C123F	861-001-53	
R4		1	RESISTOR, 75Ω, 2W	183-R75-42	
R5		1	RESISTOR, 150Ω, 1/2W	174-151-41	
R6		5	RESISTOR, 47Ω, 1/4W	366-470-41	
R7			RESISTOR, 47Ω, 1/4W	366-470-41	
R8		1	RESISTOR, 6.8K, 1/2W	174-682-41	
R9		2	RESISTOR, 200Ω, 1/4W	366-201-41	
R10		5	RESISTOR, 22Ω, 1/4W	366-220-41	
R11		1	RESISTOR, 5.6K, 1/4W	366-562-41	
R12		3	RESISTOR, VARIABLE, 500Ω, 1/2W	972-501-44	
R13		1	RESISTOR, 2.61K, 1/4W	188-2611-43	
R14			RESISTOR, 47Ω, 1/4W	366-470-41	
R15		3	RESISTOR, 1K, 1/4W	366-102-41	
R16		1	RESISTOR, 1.21K, 1/8W	187-1211-43	
R17		1	RESISTOR, 1.8K, 1W	175-182-41	
R18		1	RESISTOR, 27K, 1/4W	366-273-41	
R19		1	RESISTOR, 2.2K, 1/4W	366-222-41	
R20		4	RESISTOR, 220Ω, 1/4W	366-221-41	
R21		2	RESISTOR, 2.7K, 1/4W	366-272-41	
R22		1	RESISTOR, 120Ω, 1/4W	366-121-41	
R23		4	RESISTOR, 680Ω, 1/4W	366-681-41	
R24		2	RESISTOR, 82Ω, 1/4W	366-820-41	
R25			RESISTOR, 82Ω, 1/4W	366-820-41	
R26			RESISTOR, 200Ω, 1/4W	366-201-41	
R27			RESISTOR, 22Ω, 1/4W	366-220-41	
R28		2	RESISTOR, 1.2K, 1/4W	366-122-41	
R29		3	RESISTOR, 1.8K, 1/4W	366-182-41	
R30			RESISTOR, 47Ω, 1/4W	366-470-41	
R31		1	RESISTOR, 261Ω, 1/8W	187-2610-43	
R32		1	RESISTOR, VARIABLE, 200Ω, 1/2W	972-201-44	
R33		1	RESISTOR, 866Ω, 1/8W	187-8660-43	
R34		3	RESISTOR, 470Ω, 1/4W	366-471-41	
R35		1	RESISTOR, 120Ω, 1/2W	174-121-41	
R36		1	RESISTOR, 3.9K, 1/4W	366-392-41	
R37		1	RESISTOR, 390Ω, 1/4W	366-391-41	
R38			RESISTOR, 220Ω, 1/4W	366-221-41	
R39			RESISTOR, 2.7K, 1/4W	366-272-41	
R40			RESISTOR, 22Ω, 1/4W	366-220-41	
R41			RESISTOR, 680Ω, 1/4W	366-681-41	
R42		1	RESISTOR, 150Ω, 1/4W	366-151-41	
R43		1	RESISTOR, 330Ω, 1/4W	366-331-41	
R44		1	RESISTOR, 39Ω, 1/4W	366-390-41	
R45		3	RESISTOR, 100Ω, 1/4W	366-101-41	
R46		2	RESISTOR, 180Ω, 1/4W	366-181-41	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A4A1R47			RESISTOR, 22Ω, 1/4W	366-220-41	7-20-A
R48		2	RESISTOR, 4.7K, 1/4W	366-472-41	
R49			RESISTOR, 1K, 1/4W	366-102-41	
R50			RESISTOR, 1K, 1/4W	366-102-41	
R51			RESISTOR, VARIABLE, 500Ω, 1/2W	972-501-44	
R52		2	RESISTOR, 2.15K, 1/8W	2636-2151-43	
R53		2	RESISTOR, 1.21K, 1/8W	2636-1211-43	
R54			NOT USED		
R55		2	RESISTOR, 1.62K, 1/8W	184-1621-43	
R56		2	RESISTOR, 22K, 1/4W	366-223-41	
R57			RESISTOR, 1.8K, 1/4W	366-182-41	
R58			RESISTOR, 220Ω, 1/4W	366-221-41	
R59			NOT USED		
R60			RESISTOR, 3K, 1/4W	366-302-41	
R61			RESISTOR, 100Ω, 1/4W	366-101-41	
R62			RESISTOR, 680Ω, 1/4W	366-681-41	
R63			RESISTOR, 470Ω, 1/4W	366-471-41	
R64			RESISTOR, 470Ω, 1/4W	366-471-41	
R65		1	RESISTOR, 270Ω, 1/4W	366-271-41	
R66			RESISTOR, 4.7K, 1/4W	366-472-41	
R67			RESISTOR, 22Ω, 1/4W	366-220-41	
R68			RESISTOR, 180Ω, 1/4W	366-181-41	
R69			RESISTOR, 1.62K, 1/8W	184-1621-43	
R70			RESISTOR, 47Ω, 1/4W	366-470-41	
R71			RESISTOR, VARIABLE, 500Ω, 1/2W	972-501-44	
R72			RESISTOR, 2.15K, 1/8W	2636-2151-43	
R73			RESISTOR, 1.21K, 1/8W	2636-1211-43	
R74			RESISTOR, 2.2K, 1W	175-222-41	
R75		2	RESISTOR, 68Ω, 1/4W	366-680-41	
R76			RESISTOR, 68Ω, 1/4W	366-680-41	
R77			RESISTOR, 22K, 1/4W	366-223-41	
R78			RESISTOR, 1.8K, 1/4W	366-182-41	
R79			RESISTOR, 220Ω, 1/4W	366-221-41	
R80			RESISTOR, 3K, 1/4W	366-302-41	
R81			RESISTOR, 100Ω, 1/4W	366-101-41	
R82			RESISTOR, 680Ω, 1/4W	366-681-41	
R83			NOT USED		
R84		1	RESISTOR, 470Ω, 1/2W	174-471-41	
R85			RESISTOR, 1.2K, 1/4W	366-122-41	
U1		4	INTEGRATED CIRCUIT, LM723CJ	2203-000-63	
U2		4	INTEGRATED CIRCUIT, MC3423P1	1999-000-63	
U3			INTEGRATED CIRCUIT, LM723CJ	2203-000-63	
U4			INTEGRATED CIRCUIT, MC3423P1	1999-000-63	
U5			INTEGRATED CIRCUIT, LM723CJ	2203-000-63	
U6			INTEGRATED CIRCUIT, MC3423P1	1999-000-63	
U7			INTEGRATED CIRCUIT, LM723CJ	2203-000-63	
U8			INTEGRATED CIRCUIT, MC3423P1	1999-000-63	
VR1		1	DIODE, ZENER, 1N753A	368-008-52	
VR2		2	DIODE, ZENER, 1N825	1066-000-52	
VR3			DIODE, ZENER, 1N825	1066-000-52	
XU1		4	IC SOCKET, 14 PIN	1618-000-85	
XU2		4	IC SOCKET, 8 PIN	2142-000-85	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A4A1XU3			IC SOCKET, 14 PIN	1618-000-85	7-20-A
XU4			IC SOCKET, 8 PIN	2142-000-85	
XU5			IC SOCKET, 14 PIN	1618-000-85	
XU6			IC SOCKET, 8 PIN	2142-000-85	
XU7			IC SOCKET, 14 PIN	1618-000-85	
XU8			IC SOCKET, 8 PIN	2142-000-85	
1A4A2		1	HEATSINK ASSEMBLY	2384-000-73	
C3		2	CAPACITOR, 0.01μF, 100V	1127-103-34	
C4			CAPACITOR, 0.01μF, 100V	1127-103-34	
Q1		3	TRANSISTOR, 2N6055	1057-000-62	
Q2			TRANSISTOR, 2N6055	1057-000-62	
Q3			TRANSISTOR, 2N6055	1057-000-62	
1A5	296154-1	1	DISPLAY ASSEMBLY	296154-1	See Section 9
1A6	295852-2		ABSOLUTE POWER PC BOARD ASSEMBLY	295852-2	7-21
C1	299240-1	2	CAPACITOR, 6.8μF	T368B225MO35AS	
C2	299244	2	CAPACITOR, .01μF	5HKS-S10	
C3	299240-1		CAPACITOR, 6.8μF	T368B225MO35AS	
C4	299244		CAPACITOR, .01μF	5HKS-S10	
CR1	293226	6	DIODE	1N100A	
CR2	293226		DIODE	1N100A	
CR3	293226		DIODE	1N100A	
CR4	293226		DIODE	1N100A	
CR5	293226		DIODE	1N100A	
CR6	293226		DIODE	1N100A	
J1	294214	1	HEADER ASSEMBLY, 14 PIN	87230-7	
J2	299933	2	HEADER ASSEMBLY, 26 PIN	1-87230-3	
J3	299933		HEADER ASSEMBLY, 26 PIN	1-87230-3	
J4	294213-2	1	HEADER ASSEMBLY, 6 PIN	87230-3	
Q1	294151	1	TRANSISTOR	2N4124	
R1	299701-512	3	RESISTOR, 5.1K, 1/4W	RC07GF512J	
R2	299701-512		RESISTOR, 5.1K, 1/4W	RC07GF512J	
R3	299701-512		RESISTOR, 5.1K, 1/4W	RC07GF512J	
R4	299701-392	1	RESISTOR, 3.9K, 1/4W	RC07GF392J	
R5	299701-242	1	RESISTOR, 2.4K, 1/4W	RC07GF242J	
R6	299701-102	1	RESISTOR, 1K, 1/4W	RC07GF102J	
R7	299701-181	4	RESISTOR, 180Ω, 1/4W	RC07GF181J	
R8	299701-181		RESISTOR, 180Ω, 1/4W	RC07GF181J	
R9	299701-181		RESISTOR, 180Ω, 1/4W	RC07GF181J	
R10	299701-181		RESISTOR, 180Ω, 1/4W	RC07GF181J	
S1	293689-2	1	SWITCH	76PB04	
U1	293698	2	INTEGRATED CIRCUIT	SN74147N	
U2	293698		INTEGRATED CIRCUIT	SN74147N	
U3	293364	3	INTEGRATED CIRCUIT	SN7404N	
U4	293364		INTEGRATED CIRCUIT	SN7404N	
U5	293417	3	INTEGRATED CIRCUIT	82S82N	
U6	293597	2	INTEGRATED CIRCUIT	SN74LS85N	
U7	293597		INTEGRATED CIRCUIT	AN74LS85N	
U8	293696	1	INTEGRATED CIRCUIT	SN7483N	
U9	293414	4	INTEGRATED CIRCUIT	SN74157N	
U10	293414		INTEGRATED CIRCUIT	SN74157N	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A6U11	293364		INTEGRATED CIRCUIT	SN7404N	7-21
U12	293695	1	INTEGRATED CIRCUIT	SN7411N	
U13	293414		INTEGRATED CIRCUIT	SN74157N	
U14	293414		INTEGRATED CIRCUIT	SN74157N	
U15	293417		INTEGRATED CIRCUIT	82S82N	
U16	293361	1	INTEGRATED CIRCUIT	SN7408N	
U17	293362	1	INTEGRATED CIRCUIT	SN7402N	
U18	293417		INTEGRATED CIRCUIT	82S82N	
U19			NOT USED		
U20			NOT USED		
U21	293358	1	INTEGRATED CIRCUIT	SN7425N	
U22	293450	1	INTEGRATED CIRCUIT	SN7432N	
U23	293691-4	3	RESISTOR PACK, 5.1K	314A512	
U24	293691-4		RESISTOR PACK, 5.1K	314A512	
U25	293691-4		RESISTOR PACK, 5.1K	314A512	
	294566	3	SOCKET, 24 PIN	C932410	
	294567	9	SOCKET, 16 PIN	C931610	
	294573	11	SOCKET, 14 PIN	C931410	
1A7	230195-6	1	ATTENUATOR, FIXED	230195-6	
1A8	296123-1	1	LOG IF AMPLIFIER ASSEMBLY	296123-1	7-22
FL1	293608	1	CAPACITOR, FILTER	1201-066	
	208674-1	1	CAPACITOR, FEEDTHROUGH, 1000pF	FB2B	
	299233	1	CONNECTOR, BUCKHEAD	51-045-0000	
L12	299237-054	1	INDUCTOR, 27μH	1025-54	
1A8A1	296119-1	1	LOG IF AMPLIFIER PC ASSEMBLY	296119-1	7-22
C1	293736	7	CAPACITOR, 33pF	308-000-C0G0330G	
C2	293810	13	CAPACITOR, 3000pF	DD-302	
C3	293735	7	CAPACITOR, 22pF	301-000-C0G0220G	
C4	293810		CAPACITOR, 3000pF	DD-302	
C5	293747	1	CAPACITOR VARIABLE, 15-60pF	538-011-F15-60	
C6	293810		CAPACITOR, 3000pF	DD-302	
C7	293810		CAPACITOR, 3000pF	DD-302	
C8	293810		CAPACITOR, 3000pF	DD-302	
C9	293735		CAPACITOR, 22pF	301-000-C0G0220G	
C10	293736		CAPACITOR, 33pF	308-000-C0G0330G	
C11	293810		CAPACITOR, 3000pF	DD-302	
C12	293735		CAPACITOR, 22pF	301-000-C0G0220G	
C13	293736		CAPACITOR, 33pF	308-000-C0G0330G	
C14	293810		CAPACITOR, 3000pF	DD-302	
C15	293810		CAPACITOR, 3000pF	DD-302	
C16	293735		CAPACITOR, 22pF	301-000-C0G0220G	
C17	293736		CAPACITOR, 33pF	308-000-C0G0330G	
C18	293810		CAPACITOR, 3000pF	DD-302	
C19	293735		CAPACITOR, 22pF	301-000-C0G0220G	
C20	293736		CAPACITOR, 33pF	308-000-C0G0330G	
C21	293810		CAPACITOR, 3000pF	DD-302	
C22	293810		CAPACITOR, 3000pF	DD-302	
C23	293735		CAPACITOR, 22pF	301-000-C0G0220G	
C24	293736		CAPACITOR, 33pF	308-000-C0G0330G	
C25	293810		CAPACITOR, 3000pF	DD-302	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A8A1C26	293735		CAPACITOR, 22pF	301-000-C0G0220G	7-22
C27	293736		CAPACITOR, 33pF	308-000-C0G0330G	
C28	293810		CAPACITOR, 3000pF	DD-302	
C29			NOT USED		
C30	299243	2	CAPACITOR, 1000pF	CK60AW102M	
C31	299243		CAPACITOR, 1000pF	CK60AW102M	
E1	293310	3	TERMINAL	1597-2-01	
E2	293310		TERMINAL	1597-2-01	
E3	293310		TERMINAL	1597-2-01	
L1	294029	8	INDUCTOR, 1μH	4425-6F	
L2			P/O PC BOARD		
L3	294029		INDUCTOR, 1μH	4425-6F	
L4	115297-2	2	INDUCTOR, 14μH	1840-34	
L5	294029		INDUCTOR, 1μH	4425-6F	
L6	294029		INDUCTOR, 1μH	4425-6F	
L7	294029		INDUCTOR, 1μH	4425-6F	
L8	294029		INDUCTOR, 1μH	4425-6F	
L9	294029		INDUCTOR, 1μH	4425-6F	
L10	294029		INDUCTOR, 1μH	4425-6F	
L11	115297-2		INDUCTOR, 14μH	1840-34	
Q1	294151	2	TRANSISTOR	2N4124	
Q2	294151		TRANSISTOR	2N4124	
R1	299701-102	7	RESISTOR, 1K, 1/4W	RC07GF102J	
R2	299709-355	1	RESISTOR, 2.21K, 1/8W	RN60C2211F	
R3	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R4	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R5	299709-322	1	RESISTOR, 1K, 1/8W	RN60C1001F	
R6	299709-252	2	RESISTOR, 221Ω, 1/8W	RN60C2210F	
R7	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R8	299709-313	1	RESISTOR, 825Ω, 1/8W	RN60C8250F	
R9	299701-102		RESISTOR, 1K, 1/4W	RC0GF102J	
R10	299701-102		RESISTOR, 1K, 1/4W	RC0GF102J	
R11	299701-102		RESISTOR, 1K, 1/4W	RC0GF102J	
R12	299709-252		RESISTOR, 221Ω, 1/8W	RN60C2210F	
Z1	230541-3	9	INTEGRATED CIRCUIT	SL521C	
Z2	230541-3		INTEGRATED CIRCUIT	SL521C	
Z3	230541-3		INTEGRATED CIRCUIT	SL521C	
Z4	230541-3		INTEGRATED CIRCUIT	SL521C	
Z5	230541-3		INTEGRATED CIRCUIT	SL521C	
Z6	230541-3		INTEGRATED CIRCUIT	SL521C	
Z7	230541-3		INTEGRATED CIRCUIT	SL521C	
Z8	230541-3		INTEGRATED CIRCUIT	SL521C	
Z9	230541-3		INTEGRATED CIRCUIT	SL521C	
1A9	230471-2	1	COMB GENERATOR	230471-2	
1A10	296225-1	1	RF/IF ASSEMBLY	296225-1	7-23
A1	296236-1	1	IF PROCESSOR ASSEMBLY	296236-1	
A2	295933-1	1	YIG-TUNED OSCILLATOR	295933-1	
A3	299463-2	1	YIG FILTER	299463-2	
A4	230500-1	1	MIXER BIAS ASSEMBLY	230500-1	
A5	296237-1	1	LOOP CONTROL ASSEMBLY	296237-1	
A6	296238-1	1	LOCAL OSCILLATOR ASSEMBLY	296238-1	
A7	231079-1	8	RF SWITCH	231079-1	
A8	231079-1		RF SWITCH	231079-1	
A9	231079-1		RF SWITCH	231079-1	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A10	231079-1		RF SWITCH	231079-1	7-23
A11	230191-1	1	LOWPASS FILTER	230191-1	
A12	299395-4	1	YIG DRIVER PCB ASSEMBLY	299395-4	
A13	230567-2	1	MICROWAVE MIXER	230567-2	
A14	230195-5	1	FIXED ATTENUATOR	230195-5	
A15	230195-1	1	FIXED ATTENUATOR	230195-1	
A16	230194	3	COUPLER, 6dB	230194	
A17	230478	1	HARMONIC MIXER	230478	
A18	230625	2	RF AMPLIFIER ASSEMBLY	230625	
A19	230194		COUPLER, 6dB	230194	
A20	299374	1	BANDPASS FILTER	299374	
A21	230215	1	ISOLATOR	230215	
A22	294468-1	1	FIXED ATTENUATOR	294468-1	
A23	230224	1	LOOP MIXER	230224	
A24	230471-2	1	COMB GENERATOR	230471-2	
A25	230195-3	1	FIXED ATTENUATOR	230195-3	
A26	230817	1	OSCILLATOR	230817	
A27			NOT USED		
A28			NOT USED		
A29	231079-1		RF SWITCH	231079-1	
A30	231079-1		RF SWITCH	231079-1	
A31	230625		RF AMPLIFIER ASSEMBLY	230625	
A32	299400-2	1	HEAT SINK ASSY YIG DRIVER	299400-2	
A33	231079-1		RF SWITCH	231079-1	
A34	231079-1		RF SWITCH	231079-1	
A35	230194		COUPLER, 6dB	230194	
C1	299240-1	1	CAPACITOR, 6.8μF	T368B225M035AS	
C2	299240-4	1	CAPACITOR, ELECTROLYTIC 100μF	T362D107M020AS	
CR1	114233-2	4	DIODE	1N2071	
CR2	114233-2		DIODE	1N2071	
CR3	114233-2		DIODE	1N2071	
CR4	114233-2		DIODE	1N2071	
J18	294355	1	CONNECTOR	294355	
MP1	294652	1	ADAPTER	294652	
MP2	294653	1	ADAPTER	294653	
MP3	296199-1	1	BRACKET, COUPLER	296199-1	
MP4	298573	1	SUPPORT, COUPLER	298573	
MP5	296226-1	1	PLATE, FILTER MTG.	296226-1	
MP6	298025	1	BRACKET SWITCH	298025	
MP7	294299	1	SHIELD MU METAL	294299	
MP8	296228-1	1	CLAMP	296228-1	
MP9	294909	1	CLAMP CABLE	294909	
MP10	990211-1	2	CLAMP CABLE	990211-1	
MP11	MS35489-11	1	GROMMET	MS35489-11	
P5	294352	1	CONNECTOR	294352	
R1	299703-390	1	RESISTOR, 39Ω, 1W, ±5%	RC32GF390J	
W1	298505-18	1	CABLE ASSEMBLY	298505-18	
W2	298505-7	1	CABLE ASSEMBLY	298505-7	
W3	298505-46	1	CABLE ASSEMBLY	298505-46	
W4	298505-15	1	CABLE ASSEMBLY	298505-15	
W5	298505-91	1	CABLE ASSEMBLY	298505-91	
W6	298505-80	1	CABLE ASSEMBLY	298505-80	
W7	298505-30	1	CABLE ASSEMBLY	298505-30	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10W8	298505-11	1	CABLE ASSEMBLY	298505-11	7-23
W9	298505-14	1	CABLE ASSEMBLY	298505-14	
W10	298505-31	1	CABLE ASSEMBLY	298505-31	
W11	298505-54	2	CABLE ASSEMBLY	298505-54	
W12	298505-54		CABLE ASSEMBLY	298505-54	
W13	298505-49	2	CABLE ASSEMBLY	298505-49	
W14	298505-63	1	CABLE ASSEMBLY	298505-63	
W15	298505-47	2	CABLE ASSEMBLY	298505-47	
W16	298505-38	1	CABLE ASSEMBLY	298505-38	
W17	298505-3	1	CABLE ASSEMBLY	298505-3	
W18	298505-50	2	CABLE ASSEMBLY	298505-50	
W19	298505-84	1	CABLE ASSEMBLY	298505-84	
W20	298505-85	1	CABLE ASSEMBLY	298505-85	
W21	298505-86	1	CABLE ASSEMBLY	298505-86	
W22	298505-39	1	CABLE ASSEMBLY	298505-39	
W23	298505-49		CABLE ASSEMBLY	298505-49	
W24	298505-1	1	CABLE ASSEMBLY	298505-1	
W25	298505-47		CABLE ASSEMBLY	298505-47	
W26	298505-111	1	CABLE ASSEMBLY	298505-111	
W27	298505-50		CABLE ASSEMBLY	298505-50	
W28	298505-5	1	CABLE ASSEMBLY	298505-5	
W29	298505-8	1	CABLE ASSEMBLY	298505-8	
W30	298505-52	1	CABLE ASSEMBLY	298505-52	
W31	298505-10	1	CABLE ASSEMBLY	298505-10	
W32	298505-92	1	CABLE ASSEMBLY	298505-92	
1A10A1	296236-1	1	IF PROCESSOR ASSEMBLY	296236-1	7-24
A1	299335-1	1	PROCESSOR BOARD ASSEMBLY	299335-1	
A2	230302-7	1	FILTER BOARD ASSEMBLY	230302-7	
A3	230302-8	1	FILTER BOARD ASSEMBLY	230302-8	
A4	230627-1	1	MIXER BOARD ASSEMBLY	230627-1	
A5	230394-1	1	IF AMPLIFIER BOARD ASSEMBLY	230394-1	
C1	299240-1	2	CAPACITOR, 6.8μF, 35V	T3688685MO35AS	
C2	299240-1		CAPACITOR, 6.8μF, 35V	T3688685MO35AS	
FL1	293608-2	17	FILTER, FEEDTHROUGH	1201-066	
FL2	293608-2		FILTER, FEEDTHROUGH	1201-066	
FL3	293608-2		FILTER, FEEDTHROUGH	1201-066	
FL4	293608-2		FILTER, FEEDTHROUGH	1201-066	
FL5	293608-2		FILTER, FEEDTHROUGH	1201-066	
FL6	293608-2		FILTER, FEEDTHROUGH	1201-066	
FL7	293608-2		FILTER, FEEDTHROUGH	1201-066	
FL8	293608-2		FILTER, FEEDTHROUGH	1201-066	
FL9	293608-2		FILTER, FEEDTHROUGH	1201-066	
FL10	293608-2		FILTER, FEEDTHROUGH	1201-066	
FL11	293608-2		FILTER, FEEDTHROUGH	1201-066	
FL12	293608-2		FILTER, FEEDTHROUGH	1201-066	
FL13	293608-2		FILTER, FEEDTHROUGH	1201-066	
FL14	293608-2		FILTER, FEEDTHROUGH	1201-066	
FL15	293608-2		FILTER, FEEDTHROUGH	1201-066	
FL16	293608-2		FILTER, FEEDTHROUGH	1201-066	
FL17	293608-2		FILTER, FEEDTHROUGH	1201-066	
J1	295396-1	3	CONNECTOR	51-347-0000	
J2	295396-1		CONNECTOR	51-347-0000	
J3	295396-1		CONNECTOR	51-347-0000	
J4	294344-1	2	CONNECTOR	50-645-4524-31	
J5	294344-1		CONNECTOR	50-645-4524-31	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A1A1	299335-1	1	PROCESSOR PC BOARD ASSEMBLY	299335-1	7-24
C1	293810	24	CAPACITOR, 3000pF	DD302	
C2	293810		CAPACITOR, 3000pF	DD302	
C3	293810		CAPACITOR, 3000pF	DD302	
C4	293810		CAPACITOR, 3000pF	DD302	
C5	293810		CAPACITOR, 3000pF	DD302	
C6	293747	2	CAPACITOR, VARIABLE, 15-60pF	538-011-F15-60	
C7	299893-471	2	CAPACITOR, 470pF	CK60AX471K	
C8			NOT USED		
C9	299893-471		CAPACITOR, 470pF	CK60AX471K	
C10			NOT USED		
C11			NOT USED		
C12	293810		CAPACITOR, 3000pF	DD302	
C13			NOT USED		
C14	293810		CAPACITOR, 3000pF	DD302	
C15			NOT USED		
C16	293810		CAPACITOR, 3000pF	DD302	
C17			NOT USED		
C18	293810		CAPACITOR, 3000pF	DD302	
C19	293810		CAPACITOR, 3000pF	DD302	
C20	293810		CAPACITOR, 3000pF	DD302	
C21	293810		CAPACITOR, 3000pF	DD302	
C22	293810		CAPACITOR, 3000pF	DD302	
C23	293810		CAPACITOR, 3000pF	DD302	
C24	293810		CAPACITOR, 3000pF	DD302	
C25	293810		CAPACITOR, 3000pF	DD302	
C26	293810		CAPACITOR, 3000pF	DD302	
C27	293810		CAPACITOR, 3000pF	DD302	
C28	293810		CAPACITOR, 3000pF	DD302	
C29			NOT USED		
C30			NOT USED		
C31	293810		CAPACITOR, 3000pF	DD302	
C32			NOT USED		
C33			NOT USED		
C34	293747		CAPACITOR, VARIABLE, 15-60pF	538-011-F15-60	
C35	293810		CAPACITOR, 3000pF	DD302	
C36	293810		CAPACITOR, 3000pF	DD302	
C37	293810		CAPACITOR, 3000pF	DD302	
C38	293810		CAPACITOR, 3000pF	DD302	
CR1	299251-1	10	DIODE	1N4009	
CR2	299251-1		DIODE	1N4009	
CR3	299251-1		DIODE	1N4009	
CR4	299251-1		DIODE	1N4009	
CR5	299251-1		DIODE	1N4009	
CR6	299251-1		DIODE	1N4009	
CR7	299251-1		DIODE	1N4009	
CR8	299251-1		DIODE	1N4009	
CR9	299251-1		DIODE	1N4009	
CR10	299251-1		DIODE	1N4009	
E1	990007-001	3	TERMINAL, TURRET	1558-2-05	
E2	990007-001		TERMINAL, TURRET	1558-2-05	
E3	990007-001		TERMINAL, TURRET	1558-2-05	
L1	299237-32	9	INDUCTOR, 3.3μH	1025-32	
L2	115297-2	2	INDUCTOR, 14μH	1840-34	
L3	299237-32		INDUCTOR, 3.3μH	1025-32	
L4	115297-2		INDUCTOR, 14μH	1840-34	
L5	299237-32		INDUCTOR, 3.3μH	1025-32	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A1A1L6	299237-32		INDUCTOR, 3.3μH	1025-32	7-24
L7	299237-32		INDUCTOR, 3.3μH	1025-32	
L8	299237-32		INDUCTOR, 3.3μH	1025-32	
L9	299237-32		INDUCTOR, 3.3μH	1025-32	
L10	115297-4	1	INDUCTOR, 3.3μH	1840-18	
L11	299237-32		INDUCTOR, 3.3μH	1025-32	
L12	299237-32		INDUCTOR, 3.3μH	1025-32	
Q1	230541-1	2	TRANSISTOR	BFR-94	
Q2	230541-1		TRANSISTOR	BFR-94	
R1	299701-560	1	RESISTOR, 56Ω, 1/4W	RC07GF560J	
R2	293668	2	RESISTOR, 270Ω, 5W, 5%	RS5-270	
R3	299701-100	2	RESISTOR, 10Ω, 1/4W	RC07GF100J	
R4	299701-100		RESISTOR, 10Ω, 1/4W	RC07GF100J	
R5	299703-390	2	RESISTOR, 39Ω, 1W, 5%	RC32GF390J	
R6	293664	5	RESISTOR, 650Ω, 1W, 1%	RS1A-650	
R7			NOT USED		
R8			NOT USED		
R9	294747	4	RESISTOR, VARIABLE, 1K	3339P-1-102	
R10			NOT USED		
R11	299702-152	5	RESISTOR, 1.5K, 1/2W	RC20GF152J	
R12	293664		RESISTOR, 650Ω, 1W, 1%	RS1A-650	
R13			NOT USED		
R14			NOT USED		
R15			NOT USED		
R16			NOT USED		
R17	299702-152		RESISTOR, 1.5K, 1/2W	RC20GF152J	
R18	293664		RESISTOR, 650Ω, 1W, 1%	RS1A-650	
R19			NOT USED		
R20			NOT USED		
R21	294747		RESISTOR, VARIABLE, 1K	3339P-1-102	
R22			NOT USED		
R23	299702-152		RESISTOR, 1.5K, 1/2W	RC20GF152J	
R24	293664		RESISTOR, 650Ω, 1W, 1%	RS1A-650	
R25			NOT USED		
R26			NOT USED		
R27	294747		RESISTOR, VARIABLE, 1K	3339P-1-102	
R28	299701-620	1	RESISTOR, 62Ω, 1/4W	RC07GF620J	
R29	299702-152		RESISTOR, 1.5K, 1/2W	RC20GF152J	
R30	299701-201	1	RESISTOR, 200Ω, 1/4W	RC07GF201J	
R31	293668		RESISTOR, 270Ω, 5W, 5%	RS5-270	
R32			NOT USED		
R33			NOT USED		
R34	299703-390		RESISTOR, 39Ω, 1W, 5%	RC32GF390J	
R35	299701-470	2	RESISTOR, 47Ω, 1/4W	RC07GF470J	
R36	299701-202	1	RESISTOR, 2K, 1/4W	RC07GF202J	
R37	299701-470		RESISTOR, 47Ω, 1/4W	RC07GF470J	
R38	299701-511	1	RESISTOR, 510Ω, 1/4W	RC07GF511J	
R39	293664		RESISTOR, 650Ω, 1W, 1%	RS1A-650	
R40	294747		RESISTOR, 1.5K 1/2W	RC20GF152J	
R41	299702-152		RESISTOR, VARIABLE, 1K	3339P-1-102	
R42	299701-360	1	RESISTOR, 36Ω, 1/4W	RC07GF360J	
T1	230531-3	2	TRANSFORMER	230531-3	
T2	230531-3		TRANSFORMER	230531-3	
1A10A1A2	230302-7	1	FILTER BOARD ASSEMBLY	230302-7	7-25
A1	231012-1	1	FILTER, CRYSTAL	231012-1	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A1A2A2	231012-2	1	FILTER, CRYSTAL	231012-2	7-25
A3	231012-3	1	FILTER, CRYSTAL	231012-3	
C1	293810	21	CAPACITOR, 3000pF	DD-302	
C2	293810		CAPACITOR, 3000pF	DD-302	
C3	293810		CAPACITOR, 3000pF	DD-302	
C4	293810		CAPACITOR, 3000pF	DD-302	
C5	293810		CAPACITOR, 3000pF	DD-302	
C6	293810		CAPACITOR, 3000pF	DD-302	
C7	293810		CAPACITOR, 3000pF	DD-302	
C8	293810		CAPACITOR, 3000pF	DD-302	
C9	293810		CAPACITOR, 3000pF	DD-302	
C10	293810		CAPACITOR, 3000pF	DD-302	
C11	293810		CAPACITOR, 3000pF	DD-302	
C12	293810		CAPACITOR, 3000pF	DD-302	
C13	293810		CAPACITOR, 3000pF	DD-302	
C14	293810		CAPACITOR, 3000pF	DD-302	
C15	293810		CAPACITOR, 3000pF	DD-302	
C16	293810		CAPACITOR, 3000pF	DD-302	
C17	293810		CAPACITOR, 3000pF	DD-302	
C18	293810		CAPACITOR, 3000pF	DD-302	
C19	293810		CAPACITOR, 3000pF	DD-302	
C20	293810		CAPACITOR, 3000pF	DD-302	
C21	299250-181	2	CAPACITOR, 180pF	CM04FD181J03	
C22	299241-070	1	CAPACITOR, 7pF	DM5CC-070D	
C23	299250-471	2	CAPACITOR, 470pF	CM06FD471J03	
C24			NOT USED		
C25	299250-131	1	CAPACITOR, 130pF	CM04FD131J03	
C26	299250-181		CAPACITOR, 180pF	CM04FD181J03	
C27	299250-471		CAPACITOR, 470pF	CM06FD471J03	
C28	293810		CAPACITOR, 3000pF	DD-302	
CR1	299251	16	DIODE	1N4009	
CR2	299251		DIODE	1N4009	
CR3	299251		DIODE	1N4009	
CR4	299251		DIODE	1N4009	
CR5	299251		DIODE	1N4009	
CR6	299251		DIODE	1N4009	
CR7	299251		DIODE	1N4009	
CR8	299251		DIODE	1N4009	
CR9	299251		DIODE	1N4009	
CR10	299251		DIODE	1N4009	
CR11	299251		DIODE	1N4009	
CR12	299251		DIODE	1N4009	
CR13	299251		DIODE	1N4009	
CR14	299251		DIODE	1N4009	
CR15	299251		DIODE	1N4009	
CR16	299251		DIODE	1N4009	
E1	990007-1	3	TERMINAL, TURRET	1558-2-05	
E2	990007-1		TERMINAL, TURRET	1558-2-05	
E3	990007-1		TERMINAL, TURRET	1558-2-05	
L1	115297-2	22	INDUCTOR, 14μH	1840-34	
L2	115297-2		INDUCTOR, 14μH	1840-34	
L3	115297-2		INDUCTOR, 14μH	1840-34	
L4	115297-2		INDUCTOR, 14μH	1840-34	
L5	115297-2		INDUCTOR, 14μH	1840-34	
L6	115297-2		INDUCTOR, 14μH	1840-34	
L7	115297-2		INDUCTOR, 14μH	1840-34	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A1A2L8	115297-2		INDUCTOR, 14μH	1840-34	7-25
L9	115297-2		INDUCTOR, 14μH	1840-34	
L10	115297-2		INDUCTOR, 14μH	1840-34	
L11	115297-2		INDUCTOR, 14μH	1840-34	
L12	115297-2		INDUCTOR, 14μH	1840-34	
L13	115297-2		INDUCTOR, 14μH	1840-34	
L14	115297-2		INDUCTOR, 14μH	1840-34	
L15	115297-2		INDUCTOR, 14μH	1840-34	
L16	115297-2		INDUCTOR, 14μH	1840-34	
L17	115297-2		INDUCTOR, 14μH	1840-34	
L18	115297-2		INDUCTOR, 14μH	1840-34	
L19	115297-2		INDUCTOR, 14μH	1840-34	
L20	115297-2		INDUCTOR, 14μH	1840-34	
L21	115297-2		INDUCTOR, 14μH	1840-34	
L22	115297-2		INDUCTOR, 14μH	1840-34	
L23	231105-3	3	INDUCTOR, VARIABLE	L45-6-CT-B-4	
L24	231105-3		INDUCTOR, VARIABLE	L45-6-CT-B-4	
L25	231105-3		INDUCTOR, VARIABLE	L45-6-CT-B-4	
L26	299237-040	1	INDUCTOR, 6.8μH	1025-40	
R1	299701-101	2	RESISTOR, 100Ω, 1/4W	RC07GF101J	
R2	299703-201	4	RESISTOR, 200Ω, 1W	RC32GF201J	
R3	299703-201		RESISTOR, 200Ω, 1W	RC32GF201J	
R4	299703-201		RESISTOR, 200Ω, 1W	RC32GF201J	
R5	299703-201		RESISTOR, 200Ω, 1W	RC32GF201J	
R6	299703-561	4	RESISTOR, 560Ω, 1W	RC32GF561J	
R7	299703-561		RESISTOR, 560Ω, 1W	RC32GF561J	
R8	299703-561		RESISTOR, 560Ω, 1W	RC32GF561J	
R9	299703-561		RESISTOR, 560Ω, 1W	RC32GF561J	
R10	299701-101		RESISTOR, 100Ω, 1/4W	RC07GF301J	
R11	299701-301	4	RESISTOR, 300Ω, 1/4W	RC07GF301J	
R12	294746	1	RESISTOR, VARIABLE, 100Ω	3339P-1-101	
R13	299701-301		RESISTOR, 300Ω, 1/4W	RC07GF301J	
R14	299701-301		RESISTOR, 300Ω, 1/4W	RC07GF301J	
R15	299701-200	1	RESISTOR, 20Ω, 1/4W	RC07GF200J	
R16	299701-301		RESISTOR, 300Ω, 1/4W	RC07GF301J	
1A10A1A3	230302-8	1	FILTER BOARD ASSEMBLY	230302-8	7-25
A1	231012-1	1	FILTER, CRYSTAL	231012-1	
A2	231012-2	1	FILTER, CRYSTAL	231012-2	
A3	231012-3	1	FILTER, CRYSTAL	231012-3	
C1	293810	21	CAPACITOR, 3000pF	DD-302	
C2	293810		CAPACITOR, 3000pF	DD-302	
C3	293810		CAPACITOR, 3000pF	DD-302	
C4	293810		CAPACITOR, 3000pF	DD-302	
C5	293810		CAPACITOR, 3000pF	DD-302	
C6	293810		CAPACITOR, 3000pF	DD-302	
C7	293810		CAPACITOR, 3000pF	DD-302	
C8	293810		CAPACITOR, 3000pF	DD-302	
C9	293810		CAPACITOR, 3000pF	DD-302	
C10	293810		CAPACITOR, 3000pF	DD-302	
C11	293810		CAPACITOR, 3000pF	DD-302	
C12	293810		CAPACITOR, 3000pF	DD-302	
C13	293810		CAPACITOR, 3000pF	DD-302	
C14	293810		CAPACITOR, 3000pF	DD-302	
C15	293810		CAPACITOR, 3000pF	DD-302	
C16	293810		CAPACITOR, 3000pF	DD-302	
C17	293810		CAPACITOR, 3000pF	DD-302	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A1A3C18	293810		CAPACITOR, 3000pF	DD-302	7-25
C19	293810		CAPACITOR, 3000pF	DD-302	
C20	293810		CAPACITOR, 3000pF	DD-302	
C21	299250-181	2	CAPACITOR, 180pF	CM04FD181J03	
C22	299241-070	1	CAPACITOR, 7pF	DM5CC-070D	
C23	299250-471	2	CAPACITOR, 470pF	CM06FD471J03	
C24			NOT USED		
C25	299250-131	1	CAPACITOR, 130pF	CM04FD131J03	
C26	299250-181		CAPACITOR, 180pF	CM04FD181J03	
C27	299250-471		CAPACITOR, 470pF	CM06FD471J03	
C28	293810		CAPACITOR, 3000pF	DD-302	
CR1	299251	16	DIODE	1N4009	
CR2	299251		DIODE	1N4009	
CR3	299251		DIODE	1N4009	
CR4	299251		DIODE	1N4009	
CR5	299251		DIODE	1N4009	
CR6	299251		DIODE	1N4009	
CR7	299251		DIODE	1N4009	
CR8	299251		DIODE	1N4009	
CR9	299251		DIODE	1N4009	
CR10	299251		DIODE	1N4009	
CR11	299251		DIODE	1N4009	
CR12	299251		DIODE	1N4009	
CR13	299251		DIODE	1N4009	
CR14	299251		DIODE	1N4009	
CR15	299251		DIODE	1N4009	
CR16	299251		DIODE	1N4009	
E1	990007-1	3	TERMINAL, TURRET	1558-2-05	
E2	990007-1		TERMINAL, TURRET	1558-2-05	
E3	990007-1		TERMINAL, TURRET	1558-2-05	
L1	115297-2	22	INDUCTOR, 14μH	1840-34	
L2	115297-2		INDUCTOR, 14μH	1840-34	
L3	115297-2		INDUCTOR, 14μH	1840-34	
L4	115297-2		INDUCTOR, 14μH	1840-34	
L5	115297-2		INDUCTOR, 14μH	1840-34	
L6	115297-2		INDUCTOR, 14μH	1840-34	
L7	115297-2		INDUCTOR, 14μH	1840-34	
L8	115297-2		INDUCTOR, 14μH	1840-34	
L9	115297-2		INDUCTOR, 14μH	1840-34	
L10	115297-2		INDUCTOR, 14μH	1840-34	
L11	115297-2		INDUCTOR, 14μH	1840-34	
L12	115297-2		INDUCTOR, 14μH	1840-34	
L13	115297-2		INDUCTOR, 14μH	1840-34	
L14	115297-2		INDUCTOR, 14μH	1840-34	
L15	115297-2		INDUCTOR, 14μH	1840-34	
L16	115297-2		INDUCTOR, 14μH	1840-34	
L17	115297-2		INDUCTOR, 14μH	1840-34	
L18	115297-2		INDUCTOR, 14μH	1840-34	
L19	115297-2		INDUCTOR, 14μH	1840-34	
L20	115297-2		INDUCTOR, 14μH	1840-34	
L21	115297-2		INDUCTOR, 14μH	1840-34	
L22	115297-2		INDUCTOR, 14μH	1840-34	
L23	231105-3	3	INDUCTOR, VARIABLE	L45-6-CT-B-4	
L24	231105-3		INDUCTOR, VARIABLE	L45-6-CT-B-4	
L25	231105-3		INDUCTOR, VARIABLE	L45-6-CT-B-4	
L26	299237-040	1	INDUCTOR, 6.8μH	1025-40	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A1A3R1	299701-101	2	RESISTOR, 100Ω, 1/4W	RC07GF101J	7-25
R2	299703-201	4	RESISTOR, 200Ω, 1W	RC32GF201J	
R3	299703-201		RESISTOR, 200Ω, 1W	RC32GF201J	
R4	299703-201		RESISTOR, 200Ω, 1W	RC32GF201J	
R5	299703-201		RESISTOR, 200Ω, 1W	RC32GF201J	
R6	299703-561	4	RESISTOR, 560Ω, 1W	RC32GF561J	
R7	299703-561		RESISTOR, 560Ω, 1W	RC32GF561J	
R8	299703-561		RESISTOR, 560Ω, 1W	RC32GF561J	
R9	299703-561		RESISTOR, 560Ω, 1W	RC32GF561J	
R10	299701-101		RESISTOR, 100Ω, 1/4W	RC07GF101J	
R11	299701-301	4	RESISTOR, 300Ω, 1/4W	RC07GF301J	
R12	294746	1	RESISTOR, VARIABLE, 100Ω	3339P-1-101	
R13	299701-301		RESISTOR, 300Ω, 1/4W	RC07GF301J	
R14	299701-301		RESISTOR, 300Ω, 1/4W	RC07GF301J	
R15	299701-200	1	RESISTOR, 20Ω, 1/4W	RC07GF200J	
R16	299701-301		RESISTOR, 300Ω, 1/4W	RC07GF301J	
R17	294746	3	RESISTOR, VARIABLE, 100Ω	3339P-1-101	
R18	299701-101	3	RESISTOR, 100Ω, 1/4W	RC07GF101J	
R19	294746		RESISTOR, VARIABLE, 100Ω	3339P-1-101	
R20	299701-101		RESISTOR, 100Ω, 1/4W	RC07GF101J	
R21	294746		RESISTOR, VARIABLE, 100Ω	3339P-1-101	
R22	299701-101		RESISTOR, 100Ω, 1/4W	RC07GF101J	
1A10A1A4	230627-1	1	MIXER PC BOARD ASSEMBLY	230627-1	7-26
E1	990007-001	1	TERMINAL	1558-2-05	
M1	298756	1	MIXER	298756	
1A10A1A5	230394-1	1	IF AMPLIFIER PC BOARD ASSEMBLY	230394-1	7-26
C1	293803	4	CAPACITOR, 100pF	DD-101	
C2	293803		CAPACITOR, 100pF	DD-101	
C3	293921	1	CAPACITOR, 220pF	CK05CW221K	
C4	293803		CAPACITOR, 100pF	DD-101	
C5	293803		CAPACITOR, 100pF	DD-101	
C6	293810	7	CAPACITOR, 3000pF	DD-302	
C7	293810		CAPACITOR, 3000pF	DD-302	
C8	293810		CAPACITOR, 3000pF	DD-302	
C9	293810		CAPACITOR, 3000pF	DD-302	
C10	293747	1	CAPACITOR, VARIABLE, 15-60pF	538-011-F-15-60	
C11	293810		CAPACITOR, 3000pF	DD-302	
C12			NOT USED		
C13	293810		CAPACITOR, 3000pF	DD-302	
C14	293810		CAPACITOR, 3000pF	DD-302	
L1	294022	2	INDUCTOR, .15μH	1537-00	
L2	115297-1	2	INDUCTOR, .25μH	1840-02	
L3	115297-1		INDUCTOR, .25μH	1840-02	
L4	294022		INDUCTOR, .15μH	1537-00	
L5	115297-4	1	INDUCTOR, 3μH	1840-18	
L6	115297-2	2	INDUCTOR, 14μH	1840-34	
L7	115297-2		INDUCTOR, 14μH	1840-34	
Q1	230541-1	1	TRANSISTOR	BFR-94	
R1	299701-510	2	RESISTOR, 51Ω, 1/4W	RC07GF510J	
R2	299701-510		RESISTOR, 51Ω, 1/4W	RC07GF510J	
R3	294746	1	RESISTOR, VARIABLE, 100Ω	3339P1-1-101	
R4	299701-200	1	RESISTOR, 20Ω, 1/4W	RC07GF200J	
R5	293668	1	RESISTOR, 270Ω, 5W, 5%	RS5-270	
R6	299703-101	1	RESISTOR, 100Ω, 1W	RC32GF101J	
R7			NOT USED		
R8	299701-470	1	RESISTOR, 47Ω, 1/4W	RC07GF470J	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A2	295933-1	1	YIG OSCILLATOR, TUNED	295933-1	7-23
1A10A3	299463-2	1	YIG FILTER	299463-2	7-23
1A10A4	230500-1	1	MIXER BIAS ASSEMBLY	230500-1	7-29
C1	299243	1	CAPACITOR, 1000pF	CK60AW102M	
C2	293728	1	CAPACITOR, VARIABLE, 1.9-15.7pF	187-0109-5	
C3	293608	1	CAPACITOR, FILTER	1201-066	
L1	115297-1	1	INDUCTOR, .25µH	1840-02	
R1	299701-511	1	RESISTOR, 510Ω, 1/4W	RC07GF511J	
R2	299701-101	1	RESISTOR, 100Ω, 1/4W	RC07GF101J	
1A10A5	296237-1	1	LOOP CONTROL ASSEMBLY	296237-1	7-30
A1	299459-1	1	LOOP CONTROL PC BOARD ASSEMBLY	299459-1	7-30
A2	230410-1	1	3.5MHz OSCILLATOR PC BOARD ASSEMBLY	230410-1	7-30
A3	230402-1	1	COMB SOURCE PC BOARD ASSEMBLY	230402-1	7-31
A4	230683-1	1	100 MHz OSCILLATOR PC BOARD ASSEMBLY	230683-1	7-31
C1	299240-1	1	CAPACITOR, 6.8µF	T368B225M035AS	
FL1	293608-1	5	FILTER, FEEDTHROUGH	1201-066	7-30
FL2	293608-1		FILTER, FEEDTHROUGH	1201-066	
FL3	293608-1		FILTER, FEEDTHROUGH	1201-066	
FL4	293608-1		FILTER, FEEDTHROUGH	1201-066	
FL5	293611-1	3	FILTER, FEEDTHROUGH	1215-094	
FL6	293611-1		FILTER, FEEDTHROUGH	1215-094	
FL7	293611-1		FILTER, FEEDTHROUGH	1215-094	
FL8	293608-1		FILTER, FEEDTHROUGH	1201-066	
J1	294344-1	3	CONNECTOR	50-645-4524-31	
J2	299233-1	2	CONNECTOR	50-045-0000	
J3	294344-1		CONNECTOR	50-645-4524-31	
J4	299233-1		CONNECTOR	50-045-0000	
J5	294344-1		CONNECTOR	50-645-4524-31	
L5	231075-1	1	COIL, VARIABLE, MODIFIED	231075-1	
1A10A5A1	299459-1	1	LOOP CONTROL PC BOARD ASSEMBLY	299459-1	7-30
C1	299241-820	2	CAPACITOR, DIPPED MICA, 82pF, ±5%	DM5EY-820J	
C2	299241-100	2	CAPACITOR, DIPPED MICA, 10pF, ±.5pF	DM5CC-100J	
C3	299241-270	1	CAPACITOR, DIPPED MICA, 27pF, ±5%	DM5EC-270J	
C4	293747-001	6	CAPACITOR, VARIABLE, 15-60pF,	538-011-F-15-60	
C5	299241-080	2	CAPACITOR, DIPPED MICA, 8pF, ±.5pF	DM5CC-080D	
C6	299241-680	1	CAPACITOR, DIPPED MICA, 68pF, ±5%	DM5EY-680J	
C7	293747-001		CAPACITOR, VARIABLE, 15-60pF	538-011-F-15-60	
C8	299241-430	2	CAPACITOR, DIPPED MICA, 43pF, ±5%	DM5EC-430J	
C9	293747-001		CAPACITOR, VARIABLE, 15-60pF	538-011-F-15-60	
C10	299241-080		CAPACITOR, DIPPED MICA, 8pF, ±.5%	DM5EC-080J	
C11	299241-430		CAPACITOR, DIPPED MICA, 43pF, ±5%	DM5EC-430J	
C12	293747-001		CAPACITOR, VARIABLE, 15-60pF	538-011-F-15-60	
C13	299241-100		CAPACITOR, DIPPED MICA, 10pF, ±.5pF	DM5CC-100J	
C14	293747-001		CAPACITOR, VARIABLE, 15-60pF	538-011-F-15-60	
C15	299241-560	1	CAPACITOR, DIPPED MICA, 56pF	DM5EC-560J	
C16	299245-1	9	CAPACITOR, CERAMIC DISC, .1µF	8121-050-651-104M	
C17	299245-1		CAPACITOR, CERAMIC DISC, .1µF	8121-050-651-104M	
C18	299245-1		CAPACITOR, CERAMIC DISC, .1µF	8121-050-651-104M	
C19	293746	1	CAPACITOR, VARIABLE, 2-8pF	538-011-A-2-8	
C20	299245-1		CAPACITOR, CERAMIC DISC, .1µF	8121-050-651-104M	
C21	299241-050	2	CAPACITOR, DIPPED MICA, 5pF, ±.5pF	DM5CC-050D	
C22	299241-050		CAPACITOR, DIPPED MICA, 5pF, ±.5pF	DM5CC-050D	
C23	299241-360	1	CAPACITOR, DIPPED MICA, 36pF, ±5%	DM5EC-360J	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A5A1C24	299245-1		CAPACITOR, CERAMIC DISC, .1μF, ±5%	8121-050-651-104M	7-30
C25	299241-820		CAPACITOR, DIPPED MICA, 82ρF, ±5%	DM5EY-820J	
C26	293747-001		CAPACITOR, VARIABLE, 15-60ρF	538-011-A-15-60	
C27	299245-1		CAPACITOR, CERAMIC DISC, .1μF	8121-050-651-104M	
C28	299245-1		CAPACITOR, CERAMIC DISC, .1μF	8121-050-651-104M	
C29	293896	1	CAPACITOR, NON POLARIZED, 16μF	TVAN1204.3	
C30	115307-10	2	CAPACITOR, ELECTROLYTIC, 100μF	TE-1211	
C31	293895	1	CAPACITOR, NON POLARIZED, 10μF	TVAN1112.4	
C32	299245-2	1	CAPACITOR, CERAMIC, .01μF	8121-M058-651-103M	
C33	115307-10		CAPACITOR, ELECTROLYTIC, 100μF/25V	TE-1211	
C34	293712	1	CAPACITOR, NON POLARIZED, 2μF/50V	22μ-A205	
C35	299245-1		CAPACITOR, CERAMIC DISC, .1μF	8121-050-651-104M	
C36	299245-1		CAPACITOR, CERAMIC DISC, .1μF	8121-050-651-104M	
CR1	230542-1	2	DIODE, SCHOTTKY BARRIER	5082-2301	
CR2	230542-1		DIODE, SCHOTTKY BARRIER	5082-2301	
E1			NOT USED		
E2			NOT USED		
E3			NOT USED		
E4	990007-001	1	TERMINAL, TURRET	1558-2-05	
L1	230531-4	6	INDUCTOR, TOROID, 21μH	230531-4	
L2	230531-4		INDUCTOR, TOROID, 21μH	230531-4	
L3	230531-4		INDUCTOR, TOROID, 21μH	230531-4	
L4	299237-078	2	INDUCTOR, 270μH, ±10%	1025-78	
L5	230531-4		INDUCTOR, TOROID, 21μH	230531-4	
L6	230531-4		INDUCTOR, TOROID, 21μH	230531-4	
L7	230531-4		INDUCTOR, TOROID, 21μH	230531-4	
L8	299237-078		INDUCTOR, 270μH, ±10%	1025-78	
L9	299237-072	1	INDUCTOR, 150μH, ±10%	1025-72	
L10	294000	2	INDUCTOR, 100μH	70F104A1	
L11	294000		INDUCTOR, 100μH	70F104A1	
L12	299237-068	1	INDUCTOR, 100μH, ±10%	1025-68	
M1	231104-1	1	MIXER, DOUBLE BALANCED	231104-1	
R1	299701-681	1	RESISTOR, 680Ω, 1/4W, 5%	RC07GF681J	
R2	299701-431	1	RESISTOR, 430Ω, 1/4W, 5%	RC07GF431J	
R3	299701-103	2	RESISTOR, 10KΩ, 1/4W, 5%	RC07GF103J	
R4	299709-393	3	RESISTOR, 5.11K, 1/8W, 1%	RN60C5111F	
R5	299709-256	1	RESISTOR, 243Ω, 1/8W, 1%	RN60C2430F	
R6	299709-393		RESISTOR, 5.11K, 1/8W, 1%	RN60C5111F	
R7	299709-351	1	RESISTOR, 2KΩ, 1/8W, 1%	RN60C2001F	
R8	299709-515	1	RESISTOR, 100K, 1/8W, 1%	RN60C1003F	
R9	299709-393		RESISTOR, 5.11K, 1/8W, 1%	RN60C5111F	
R10	299701-390	2	RESISTOR, 39Ω, 1/4W, 5%	RC07GF390J	
R11	299701-752	1	RESISTOR, 7.5K, 1/4W, 5%	RC07GF752J	
R12	299701-103		RESISTOR, 10K, 1/4W, 5%	RC07GF103J	
R13	299701-102	1	RESISTOR, 1K, 1/4W, 5%	RC07GF102J	
R14	299701-390		RESISTOR, 39Ω, 1/4W, 5%	RC07GF390J	
T1	230531-2	1	TRANSFORMER	230531-2	
Z1	293399	1	INTEGRATED CIRCUIT	MC1550G	
Z2	293486	1	INTEGRATED CIRCUIT	USD770339X	
Z3	293354	1	INTEGRATED CIRCUIT	N5741V	
1A10A5A2	230410-1	1	3.5MHz OSCILLATOR PC BOARD ASSEMBLY	230410-1	7-31
C1			NOT USED		
C2	293838	1	CAPACITOR, 150ρF, ±10%	DM15151K	
C3	293839	1	CAPACITOR, 200ρF, ±10%	DM15201K	
C4	293820	4	CAPACITOR, .1μF, 75V.	DDA-104	
C5	293820		CAPACITOR, .1μF, 75V.	DDA-104	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A5A2C6	293820		CAPACITOR, .1μF, 75V.	DDA-104	7-31
C7	293820		CAPACITOR, .1μF, 75V.	DDA-104	
C8	299250-151	2	CAPACITOR, 150pF	CM0FD-151-J03	
C9	299243	1	CAPACITOR, .001μF	CK06AW102M	
C10	299250-331	2	CAPACITOR, 330pF	CM04FD-331-J03	
C11	299250-112	1	CAPACITOR, 1100pF	CM06FD-112-J03	
C12	299250-151		CAPACITOR, 150pF	CM04FD-151-J03	
C13	299250-331		CAPACITOR, 330pF	CM04FD-331-J03	
CR1	230479-4	1	CRYSTAL, 3.5MHz	230479-4	
L1	294000	1	INDUCTOR, 100μH	70F104A1	
L2	299237-048	2	INDUCTOR, 15μH	1025-48	
L3	299237-048		INDUCTOR, 15μH	1025-48	
L4	299237-028	2	INDUCTOR, 2.2μH	1025-28	
L5	299237-028		INDUCTOR, 2.2μH	1025-28	
Q1	294122	1	TRANSISTOR	2N708	
Q2	294153	1	TRANSISTOR	2N4126	
R1	299701-124	1	RESISTOR, 120K, 1/4W	RC07GF124J	
R2	299701-681	1	RESISTOR, 680Ω, 1/4W	RC07GF681J	
R3	299701-391	1	RESISTOR, 390Ω, 1/4W	RC07GF391J	
R4	299701-622	1	RESISTOR, 6.2K, 1/4W	RC07GF622J	
R5	299701-471	1	RESISTOR, 470Ω, 1/2W	RC20GF471J	
R6	299701-301	1	RESISTOR, 300Ω, 1/4W	RC07GF301J	
R7	294748	1	RESISTOR, VARIABLE, 10K	3339P-1-103	
1A10A5A3	230402-1	1	COMB SOURCE PC BOARD ASSEMBLY	230402-1	7-31
C1	299244-001	1	CAPACITOR, .01μF	5HKS-S10	
C2	293299	4	CAPACITOR, 2.2μF	CS13BE225K	
C3	293299		CAPACITOR, 2.2μF	CS13BE225K	
C4	293299		CAPACITOR, 2.2μF	CS13BE225K	
C5	293803	3	CAPACITOR, 100pF	DD-101	
C6	293814	2	CAPACITOR, 50pF	DD-500	
C7	293299		CAPACITOR, 2.2μF	CS13BE225K	
C8	293814		CAPACITOR, 50pF	DD-500	
C9	293803		CAPACITOR, 100pF	DD-101	
C10	299243-001	13	CAPACITOR, .001μF	CK60AW102M	
C11	299243-001		CAPACITOR, .001μF	CK60AW102M	
C12	299243-001		CAPACITOR, .001μF	CK60AW102M	
C13	299243-001		CAPACITOR, .001μF	CK60AW102M	
C14	293728	3	CAPACITOR, VARIABLE, 1.9-15.7pF	187-0109-5	
C15	299243-001		CAPACITOR, .001μF	CK60AW102M	
C16	299243-001		CAPACITOR, .001μF	CK60AW102M	
C17	299243-001		CAPACITOR, .001μF	CK60AW102M	
C18	299243-001		CAPACITOR, .001μF	CK60AW102M	
C19	293728		CAPACITOR, VARIABLE, 1.9-15.7pF	187-0109-5	
C20	299243-001		CAPACITOR, .001μF	CK60AW102M	
C21	299243-001		CAPACITOR, .001μF	CK60AW102M	
C22	299243-001		CAPACITOR, .001μF	CK60AW102M	
C23	299243-001		CAPACITOR, .001μF	CK60AW102M	
C24	299243-001		CAPACITOR, .001μF	CK60AW102M	
C25	293728		CAPACITOR, VARIABLE, 1.9-15.7pF	187-0109-5	
C26	293747	1	CAPACITOR, VARIABLE, 15-60pF	538-011-F15-60	
C27	293803		CAPACITOR, 100pF	DD-101	
CR1	230479-3	1	CRYSTAL, 2 MHz	230479-3	
CR2	230542-1	2	DIODE	HP5082-2301	
CR3	230542-1		DIODE	HP5082-2301	
CR4	230542-2	1	DIODE	HP5082-0180	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A5A3L1	115297-4	1	INDUCTOR, 3μH	1840-18	7-31
L2	294000	2	INDUCTOR, 100μH	70F104A1	
L3	294000		INDUCTOR, 100μH	70F104A1	
L4	115297-3	4	INDUCTOR, 1.1μH	1840-11	
L5	230529-1	3	INDUCTOR, FIXED	230529-1	
L6	115297-3		INDUCTOR, 1.1μH	1840-11	
L7	115297-3		INDUCTOR, 1.1μH	1840-11	
L8	230529-1		INDUCTOR, FIXED	230529-1	
L9	115297-3		INDUCTOR, 1.1μH	1840-11	
L10	230529-1		INDUCTOR, FIXED	230529-1	
L11	115297-1	1	INDUCTOR, .25μH	1840-02	
Q1	294151	2	TRANSISTOR	2N4124	
Q2	294151		TRANSISTOR	2N4124	
Q3	294153	1	TRANSISTOR	2N4126	
Q4	230541-2	3	TRANSISTOR	A210	
Q5	230541-2		TRANSISTOR	A210	
Q6	230541-2		TRANSISTOR	A210	
Q7	230541-1	1	TRANSISTOR	A209	
R1	299701-392	2	RESISTOR, 3.9K, 1/4W	RC07GF392J	
R2	299701-622	2	RESISTOR, 6.2K, 1/4W	RC07GF622J	
R3	299701-102	2	RESISTOR, 1K, 1/4W	RC07GF102J	
R4	299701-271	1	RESISTOR, 270Ω, 1/4W	RC07GF271J	
R5	299701-392		RESISTOR, 3.9K, 1/4W	RC07GF392J	
R6	299701-622		RESISTOR, 6.2K, 1/4W	RC07GF622J	
R7	299701-100	2	RESISTOR, 10Ω, 1/4W	RC07GF100J	
R8	299701-512	1	RESISTOR, 5.1K, 1/4W	RC07GF512J	
R9	299701-100		RESISTOR, 10Ω, 1/4W	RC07GF100J	
R10	299701-202	1	RESISTOR, 2K, 2W	RC42GF202J	
R11	299701-563	1	RESISTOR, 56K, 1/4W	RC07GF563J	
R12	299701-510	3	RESISTOR, 51Ω, 1/4W	RC07GF510J	
R13	299701-102		RESISTOR, 1K, 2W	RC42GF102J	
R14	299701-101	1	RESISTOR, 100Ω, 1W	RC20GF101J	
R15	299701-510		RESISTOR, 51Ω, 1/4W	RC07GF510J	
R16	299701-471	1	RESISTOR, 470Ω, 2W	RC42GF471J	
R17	299701-470	1	RESISTOR, 47Ω, 1/2W	RC20GF470J	
R18	299701-510		RESISTOR, 51Ω, 1/4W	RC07GF510J	
R19	293667	1	RESISTOR, 200Ω, 5W, 5%	RS5-200	
R20	299701-200	1	RESISTOR, 20Ω, 1/2W	RC20GF200J	
1A10A5A4	230683-1	1	100 MHz OSCILLATOR PC BOARD ASSEMBLY	230683-1	7-31
C1	299244-1	4	CAPACITOR, .01μF	5HKS-S10	
C2	299244-1		CAPACITOR, .01μF	5HKS-S10	
C3	293814	1	CAPACITOR, 50pF	DD-500	
C4	293836	1	CAPACITOR, 10pF	DM15-100J	
C5	299244-1		CAPACITOR, .01μF	5HKS-S10	
C6	293728	3	CAPACITOR, VARIABLE, 1.9-15.7pF	187-0109-5	
C7			NOT USED		
C8	299243	4	CAPACITOR, .001μF	CK60AW102M	
C9			NOT USED		
C10	299243		CAPACITOR, .001μF	CK60AW102M	
C11	299243		CAPACITOR, .001μF	CK60AW102M	
C12	293728		CAPACITOR, VARIABLE, 1.9-15.7pF	187-0109-5	
C13	299243		CAPACITOR, .001μF	CK60AW102M	
C14	293728		CAPACITOR, VARIABLE, 1.9-15.7pF	187-0109-5	
C15	299240-1	1	CAPACITOR, 6.8μF	T368B225M035AS	
C16	299244-1		CAPACITOR, .01μF	5HKS-S10	
CR1	230479-2	1	CRYSTAL, 100 MHz	230479-2	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A5A4E1	293310	3	TERMINAL	1597-2-01	7-31
E2	293310		TERMINAL	1597-2-01	
E3	293310		TERMINAL	1597-2-01	
L1	115297-3	2	INDUCTOR, 1.1μH	1840-11	
L2	230529-2	3	INDUCTOR	230529-2	
L3	230529-2		INDUCTOR	230529-2	
L4	230529-2		INDUCTOR	230529-2	
L5	115297-3		INDUCTOR, 1.1μH	1840-11	
Q1	230541-2	2	TRANSISTOR	A210	
Q2	230541-1	1	TRANSISTOR	A209	
Q3	230541-2		TRANSISTOR	A210	
R1	299701-471	1	RESISTOR, 470Ω, 1/4W	RC07GF471J	
R2	299702-820	1	RESISTOR, 82Ω, 1/2W	RC20GF820J	
R3	299702-200	1	RESISTOR, 20Ω, 1/2W	RC20GF200J	
R4	293653	1	RESISTOR, 27Ω, 2.25W	G3-27Ω	
R5	299701-510	1	RESISTOR, 51Ω, 1/4W	RC07GF510J	
R6	299701-122	1	RESISTOR, 1.2K, 1/4W	RC07GF122J	
R7	299701-472	2	RESISTOR, 4.7K, 1/4W	RC07GF472J	
R8	299701-472		RESISTOR, 4.7K, 1/4W	RC07GF472J	
R9	299701-331	1	RESISTOR, 330Ω, 1/4W	RC07GF331J	
R10	299701-201	1	RESISTOR, 200Ω, 1/4W	RC07GF201J	
R11	299703-20	1	RESISTOR, 16Ω, 1W	RC32GF160J	
1A10A6	296238-1	1	LOCAL OSCILLATOR ASSEMBLY	296238-1	7-27
A1	296455-1	1	VCO SHAPER PC BOARD ASSEMBLY	296455-1	
A2	231089-1	1	VCO OSCILLATOR II PC BOARD ASSEMBLY	231089-1	
E1	293320-1	6	TERMINAL FEEDTHROUGH	FT-SM-1-TUR	
E2	293320-1		TERMINAL FEEDTHROUGH	FT-SM-1-TUR	
E3	293320-1		TERMINAL FEEDTHROUGH	FT-SM-1-TUR	
E4	990209-1		TERMINAL LUG	990209-1	
FL1	293608-1	2	FILTER, FEEDTHROUGH	1201-066	
FL2	293608-1		FILTER, FEEDTHROUGH	1201-066	
FL3	294211-1	2	FILTER, FEEDTHROUGH	17.50-003	
FL4	294211-1		FILTER, FEEDTHROUGH	17.50-003	
J1	294344-1	2	CONNECTOR	50-645-4524-31	
J2	294344-1		CONNECTOR	50-645-4524-31	
R1			NOT USED		
R2			NOT USED		
R3			NOT USED		
R4			NOT USED		
R5			NOT USED		
R6			NOT USED		
R7	299701-102	1	RESISTOR, 1K, 1/4W	RC07GF102J	
TP1	293320-1		TERMINAL FEEDTHROUGH	FT-SM-1-TUR	
TP2	293320-1		TERMINAL FEEDTHROUGH	FT-SM-1-TUR	
TP3	293320-1		TERMINAL FEEDTHROUGH	FT-SM-1-TUR	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A6A1	296455-1	1	LCVCO SHAPER PC BOARD ASSEMBLY	296455-1	7-27
C1	115307-21	1	CAPACITOR, 60µF, 12V	TE-1133.5	
C2	115307-27	2	CAPACITOR, 50µF, 25V	TE-1209	
C3	115307-27		CAPACITOR, 50µF, 25V	TE-1209	
C4	293810-1	1	CAPACITOR, .003µF	DD-302	
CR1	293261-1	1	DIODE	1N5223B	
CR2	293238-1	1	DIODE	1N825A	
CR3	299251-1	2	DIODE	1N4009	
CR4	293266-1	1	DIODE	1N5243B	
CR5	299251-1		DIODE	1N4009	
L1	299396-1	1	INDUCTOR	E2409	
Q1	294153-1	1	TRANSISTOR	2N4126	
Q2	294162-1	1	TRANSISTOR	2N4922	
Q3	294126-1	2	TRANSISTOR	2N2905	
Q4	294126-1		TRANSISTOR	2N2905	
Q5	294151-1	1	TRANSISTOR	2N4124	
R1	299701-202	1	RESISTOR, 2K, 1/4W	RC07GF202J	
R2	299701-471	3	RESISTOR, 470Ω, 1/4W	RC07GF471J	
R3	299709-386	1	RESISTOR, 4.64K, 1/8W	RN60C4641F	
R4	299709-421	7	RESISTOR, 10K, 1/8W	RN60C1002F	
R5	299709-372	1	RESISTOR, 3.32K, 1/8W	RN60C3321F	
R6	299709-421		RESISTOR, 10K, 1/8W	RN60C1002F	
R7	299701-102	4	RESISTOR, 1K, 1/4W	RC07GF102J	
R8	299709-363	1	RESISTOR, 2.67K, 1/8W	RN60C2671F	
R9	299709-383	1	RESISTOR, 4.32K, 1/8W	RN60C4321F	
R10	299709-421		RESISTOR, 10K, 1/8W	RN60C1002F	
R11	299701-471		RESISTOR, 470Ω, 1/4W	RC70GF471J	
R12	299709-322	1	RESISTOR, 1K, 1/8W	RN60C1001F	
R13	299709-471	1	RESISTOR, 33.2K, 1/8W	RN60C3322F	
R14	299709-411	1	RESISTOR, 7.87K, 1/8W	RN60C7871F	
R15	299709-450	2	RESISTOR, 20K, 1/8W	RN60C2002F	
R16	299709-421		RESISTOR, 10K, 1/8W	RN60C1002F	
R17	299732-1	2	RESISTOR, VARIABLE, 10K	SV1031	
R18	299783-1	1	RESISTOR, VARIABLE, 50K	3339P-1-503	
R19	299701-101	1	RESISTOR, 100Ω, 1/4W	RC07GF101J	
R20	299709-421		RESISTOR, 10K, 1/8W	RN60C1002F	
R21	299701-471		RESISTOR, 470Ω, 1/4W	RC07GF471J	
R22	299732-1		RESISTOR, VARIABLE, 10K	SV-1031	
R23	299701-201	1	RESISTOR, 200Ω, 1/4W	RC07GF201J	
R24	299701-330	1	RESISTOR, 33Ω, 1/4W	RC07GF330J	
R25	299701-100	1	RESISTOR, 10Ω, 1/4W	RC07GF100J	
R26	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R27	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R28	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R29	299709-421		RESISTOR, 10K, 1/8W	RN60C1002F	
R30	299709-421		RESISTOR, 10K, 1/8W	RN60C1002F	
R31	299709-450		RESISTOR, 20K, 1/8W	RN60C2002F	
R32	299709-330		RESISTOR, 1.21K, 1/8W	RN60C1211F	
U1	293354-1	2	INTEGRATED CIRCUIT	UA741C	
U2	293354-1		INTEGRATED CIRCUIT	UA741C	
U3	293484-1	1	INTEGRATED CIRCUIT	UA747C	
XU1	294567-1	2	SOCKET, IC, 16 PIN	C931610	
XU2	294567-1		SOCKET, IC, 16 PIN	C931610	
XU3	294573-1	1	SOCKET, IC, 14 PIN	C931410	
1A10A6A2	231089-1	1	LCVCO OSCILLATOR II PC BOARD ASSEMBLY	231089-1	7-27
C1	293728	1	CAPACITOR, VARIABLE, 1.9-15.7ρF	187-0109-5	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A6A2C2	293730	1	CAPACITOR, VARIABLE, 1.9-8.5pF	189-253-5	7-27
C3	293878	1	CAPACITOR, STANDOFF, 1000pF	SS5D-102W	
C4			NOT USED		
C5	293804	1	CAPACITOR, 1000pF	DD-102	
C6	299241-270	1	CAPACITOR, 27pF	DM5EC-270J	
C7	299241-020	2	CAPACITOR, 2pF	DM5CC-020D	
C8	299241-020		CAPACITOR, 2pF	DM5CC-020D	
L1			NOT USED		
L2	299237-020	2	INDUCTOR, 1μH	1025-20	
L3	299237-020		INDUCTOR, 1μH	1025-20	
Q1	230541-1	3	TRANSISTOR	A209	
Q2	230541-1		TRANSISTOR	A209	
Q3	230541-1		TRANSISTOR	A209	
R1	299702-271	2	RESISTOR, 270Ω, 1/2W	RC20GF271J	
R2	299702-271		RESISTOR, 270Ω, 1/2W	RC20GF271J	
R3	299701-101	1	RESISTOR, 100Ω, 1/4W	RC07GF101J	
R4	299702-221	1	RESISTOR, 220Ω, 1/2W	RC20GF221J	
R5	299700-047	2	RESISTOR, 4.7Ω, 1/8W	RC05GF4R7J	
R6	299700-047		RESISTOR, 4.7Ω, 1/8W	RC05GF4R7J	
R7			NOT USED		
R8	293653	1	RESISTOR, 27Ω, 2 1/4W	G327Ω 2.25W	
R9	299701-240	1	RESISTOR, 24Ω, 1/4W	RC07GF240J	
R10	299701-121	1	RESISTOR, 120Ω, 1/4W	RC07GF121J	
R11	299701-180	1	RESISTOR, 18Ω, 1/4W	RC07GF180J	
R12	299701-301	1	RESISTOR, 300Ω, 1/4W	RC07GF301J	
10A7	231079-1	1	RF SWITCH	231079-1	7-23
1A10A8	231079-1	1	RF SWITCH	231079-1	7-23
1A10A9	231079-1	1	RF SWITCH	231079-1	7-23
1A10A10	231079-1	1	RF SWITCH	231079-1	7-23
1A10A11	230191-1	1	LOW PASS FILTER	230191-1	7-23
1A10A12	299395-4	1	YIG DRIVER PC BOARD ASSEMBLY	299395-4	7-32
C1	299244-1	2	CAPACITOR, .01μF	5HKS-S10	
C2	299244-1		CAPACITOR, .01μF	5HKS-S10	
C3	115307-20	1	CAPACITOR, 10μF, 12V	TE-1128	
C4			NOT USED		
C5	115307-28	1	CAPACITOR, 2μF, 50V	TE-1301	
C6	293815-1	1	CAPACITOR, .005μF	DD-502	
C7	293790-1	1	CAPACITOR, 1.2μF, 20V	CSR13BE125K	
C8	299241-101	1	CAPACITOR, 100pF	DM5FY-101J	
C9	294075-1	1	CAPACITOR, 0.1μF	8121-050-651-104M	
C10	299250-432	1	CAPACITOR, 4300pF	CM06FD432J03	
C11	299240-1	1	CAPACITOR, 6.8μF, 35V	T368B685M035AS	
C12	299241-120	1	CAPACITOR, 12pF	DM5CC-120J	
CR1	299251-1	4	DIODE	1N4009	
CR2	299251-1		DIODE	1N4009	
CR3			NOT USED		
CR4	299251-1		DIODE	1N4009	
CR5	299251-1		DIODE	1N4009	
E1			NOT USED		
E2			NOT USED		

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A12E3	990007-1	6	TERMINAL, TURRET	1558-2-05	7-32
E4	990007-1		TERMINAL, TURRET	1558-2-05	
E5	990007-1		TERMINAL, TURRET	1558-2-05	
E6	990007-1		TERMINAL, TURRET	1558-2-05	
E7	990007-1		TERMINAL, TURRET	1558-2-05	
E8	990007-1		TERMINAL, TURRET	1558-2-05	
K1	294780-1	3	RELAY, DPDT	712DM-26	
K2	294780-1		RELAY, DPDT	712DM-26	
K3	294780-1		RELAY, DPDT	712DM-26	
Q1	294161-1	2	TRANSISTOR	2N4919	
Q2			NOT USED		
Q3			NOT USED		
Q4			NOT USED		
Q5			NOT USED		
Q6			NOT USED		
Q7	294161-1		TRANSISTOR	2N4919	
Q8	294162-1	1	TRANSISTOR	2N4922	
Q9	294156-1	2	TRANSISTOR	2N4392	
Q10	294153-1	1	TRANSISTOR	2N4126	
Q11	294156-1		TRANSISTOR	2N4392	
R1	299709-393	3	RESISTOR, 5.11K, 1/8W	RN60C5111F	
R2	299709-506	1	RESISTOR, 75.0K, 1/8W	RN60C7502F	
R3	299709-478	1	RESISTOR, 39.2K, 1/8W	RN60C3922F	
R4	299709-432	1	RESISTOR, 13.0K, 1/8W (NOMINAL)	RN60C1302F	
R5	299701-102	2	RESISTOR, 1K, 1/4W	RC07GF102J	
R6			NOT USED		
R7	299702-511	1	RESISTOR, 510Ω, 1/2W (NOMINAL)	RC20GF511J	
R8			NOT USED		
R9	299709-393		RESISTOR, 5.11K, 1/8W	RN60C5111F	
R10	299709-424	1	RESISTOR, 10.7K, 1/8W	RN60C1072F	
R11	299709-389	1	RESISTOR, 4.75K, 1/8W	RN60C4751F	
R12	299709-380	1	RESISTOR, 4.02K, 1/8W (NOMINAL)	RN60C4021F	
R13	299701-470	2	RESISTOR, 47Ω, 1/4W	RC07GF470J	
R14			NOT USED		
R15	299702-561	1	RESISTOR, 560Ω, 1/2W (NOMINAL)	RC20GF561J	
R16			NOT USED		
R17	299701-201	1	RESISTOR, 200Ω, 1/4W	RC07GF201J	
R18	299701-101	1	RESISTOR, 100Ω, 1/4W	RC07GF101J	
R19			NOT USED		
R20			NOT USED		
R21			NOT USED		
R22	299778	2	RESISTOR, VARIABLE, 10K	3279W-1-103	
R23			NOT USED		
R24			NOT USED		
R25	299709-393		RESISTOR, 5.11K, 1/8W	RN60C5111F	
R26			NOT USED		
R27	299701-181	2	RESISTOR, 180Ω, 1/4W	RC07GF181J	
R28	299709-421	1	RESISTOR, 10.0K, 1/8W	RN60C1002F	
R29	299701-470		RESISTOR, 47Ω, 1/4W	RC07GF470J	
R30	299701-181		RESISTOR, 180Ω, 1/4W	RC07GF181J	
R31	299704-151	1	RESISTOR, 150Ω, 2W	RC42GF151J	
R32	299779	2	RESISTOR, VARIABLE, 2K	3279W-1-202	
R33	299701-104	3	RESISTOR, 100K, 1/4W	RC07GF104J	
R34	299701-104		RESISTOR, 100K, 1/4W	RC07GF104J	
R35	299701-514	1	RESISTOR, 510K, 1/4W	RC07GF514J	
R36	299777	1	RESISTOR, VARIABLE, 1K	3279W-1-102	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A12R37	299701-105	1	RESISTOR, 1 MEG, 1/4W	RC07GF105J	7-32
R38	299701-562	1	RESISTOR, 5.6K, 1/4W	RC07GF562J	
R39			NOT USED		
R40	299701-203	2	RESISTOR, 20K, 1/4W	RC07GF203J	
R41	299709-487	1	RESISTOR, 47.5K, 1/8W	RN60C4752F	
R42	299709-647	1	RESISTOR, 2.21 MEG, 1/8W	RN60C2214F	
R43			NOT USED		
R44	299701-100	2	RESISTOR, 10Ω, 1/4W	RC07GF100J	
R45	299701-122	1	RESISTOR, 1.2K, 1/4W	RC07GF122J	
R46	299709-267	1	RESISTOR, 301Ω, 1/8W	RN60C3010F	
R47	299709-432	1	RESISTOR, 13K, 1/8W	RN60C1302F	
R48	299779		RESISTOR, VARIABLE, 2K	3279W-1-202	
R49	299709-543	1	RESISTOR, 182K, 1/8W	RN60C1823F	
R50	299709-533	1	RESISTOR, 143K, 1/8W	RN60C1433F	
R51	299778	1	RESISTOR, VARIABLE, 10K	3279W-1-103	
R52	299709-413	1	RESISTOR, 8.25K, 1/8W	RN60C8251F	
R53	299709-386	1	RESISTOR, 4.64K, 1/8W	RN60C4641F	
R54	299701-103	2	RESISTOR, 10K, 1/4W	RC07GF103J	
R55	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R56	299701-104		RESISTOR, 100K, 1/4W	RC07GF104J	
R57	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R58	299701-203		RESISTOR, 20K, 1/4W	RC07GF203J	
R59	299709-487	1	RESISTOR, 47.5K, 1/8W	RN60C4752F	
R60	299701-100		RESISTOR, 10Ω, 1/4W	RC07GF100J	
XZ1	294565-1	3	SOCKET, IC, 8 PIN	C930810	
XZ2	294565-1		SOCKET, IC, 8 PIN	C930810	
XZ3	294565-1		SOCKET, IC, 8 PIN	C930810	
Z1	293511-1	3	INTEGRATED CIRCUIT	SN72741P	
Z2	293511-1		INTEGRATED CIRCUIT	SN72741P	
Z3	293511-1		INTEGRATED CIRCUIT	SN72741P	
1A10A13	230567-2	1	MICROWAVE MIXER	230567-2	7-23
1A10A14	230195-5	1	ATTENUATOR, FIXED	230195-5	7-23
1A10A15	230195-1	1	ATTENUATOR, FIXED	230195-1	7-23
1A10A16	230194	1	COUPLER, 6DB	230194	7-23
1A10A17	230478	1	HARMONIC MIXER	230478	7-23
1A10A18	230625	1	RF AMPLIFIER ASSEMBLY	230625	7-28
C1	208674-2	2	CAPACITOR, STANDOFF, 1000ρF	SB4A	
C2	208674-2		CAPACITOR, STANDOFF, 1000ρF	SB4A	
C3	293608	2	CAPACITOR, FILTER	1201-066	
C4	293608		CAPACITOR, FILTER	1201-066	
C5	299893-471	1	CAPACITOR, DISC, 470ρF	CK60AX471K	
E1	293320	1	TERMINAL, FEEDTHROUGH	FT-SM-1	
J1	294374	2	CONNECTOR, 3MM	901-190	
J2	294374		CONNECTOR, 3MM	901-190	
LC1	294907	1	TANK CIRCUIT	LC-374	
L1	299237-004	1	INDUCTOR, FIXED, .25μH	1025-04	
MP1	299939	1	HEAT SINK	2602TH18	
Q1	230541-5	1	TRANSISTOR	K6003	
R1	293665	1	RESISTOR, 680Ω, 1W	RS1A-680	
R2	293663	1	RESISTOR, 450Ω, 1W	RS1A-450	
R3	299701-102	1	RESISTOR, 1K, 1/4W	RC07GF102J	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A19	230194	1	COUPLER, 6DB	230194	7-23
1A10A20	299374	1	227 MHz BANDPASS FILTER	299374	7-23
1A10A21	230215	1	ISOLATOR, 40DB	230215	7-23
1A10A22	294468	1	ATTENUATOR, FIXED	294468	7-23
1A10A23	230224	1	LOOP MIXER	230224	7-23
1A10A24	230471-2	1	COMB GENERATOR	230471-2	7-23
1A10A25	230195-3	1	ATTENUATOR, FIXED	230195-3	7-23
1A10A26	230817	1	2060 MHz OSCILLATOR ASSEMBLY	230817	7-23
1A10A27			NOT USED		
1A10A28			NOT USED		
1A10A29	231079-1	1	RF SWITCH	231079-1	7-23
1A10A30	231079-1	1	RF SWITCH	231079-1	7-23
1A10A31	230625	1	RF AMPLIFIER ASSEMBLY	230625	7-28
C1	208674-2	2	CAPACITOR, STANDOFF, 1000pF	SB4A	
C2	208674-2		CAPACITOR, STANDOFF, 1000pF	SB4A	
C3	293608	2	CAPACITOR, FILTER	1201-066	
C4	293608		CAPACITOR, FILTER	1201-066	
C5	299893-471	1	CAPACITOR, DISC, 470pF	CK60AX471K	
E1	293320	1	TERMINAL, FEEDTHROUGH	FT-SM-1	
J1	294374	2	CONNECTOR, 3MM	901-190	
J2	294374		CONNECTOR, 3MM	901-190	
LC1	294907	1	TANK CIRCUIT	LC-374	
L1	299237-004	1	INDUCTOR, FIXED, .25µH	1025-04	
MP1	299939	1	HEAT SINK	2602TH18	
Q1	230541-5	1	TRANSISTOR	K6003	
R1	293665	1	RESISTOR, 680Ω, 1W	RS1A-680	
R2	293663	1	RESISTOR, 450Ω, 1W	RS1A-450	
R3	299701-102	1	RESISTOR, 1K, 1/4W	RC07GF102J	
1A10A32	299400-2	1	HEAT SINK ASSEMBLY, YIG DRIVER	299400-2	7-32
P19	294945	1	PLUG	294945	
Q2	294160	1	TRANSISTOR	2N4902	
Q3	294162	2	TRANSISTOR	2N4922	
Q4	294162		TRANSISTOR	2N4922	
R6	299703-100	1	RESISTOR, 10Ω, 1W	RC32GF100J	
R8	293656-2	4	RESISTOR, 20Ω, 5W	RH20-5	
R14	293656-2		RESISTOR, 20Ω, 5W	RH20-5	
R16	293656-2		RESISTOR, 20Ω, 5W	RH20-5	
R19	293656-2		RESISTOR, 20Ω, 5W	RH20-5	
1A10A33	231079-1	1	RF SWITCH	231079-1	7-23
1A10A34	231079-1	1	RF SWITCH	231079-1	7-23
1A10A35	230194	1	COUPLER, 6DB	230194	7-23

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A11	296200-1	1	SWEEP GENERATOR PCB ASSEMBLY	296200-1	7-33
C1	299244-1	29	CAPACITOR, 0.01μF	5HKS-S10	
C2	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C3	299240-1	5	CAPACITOR, 6.8μF	T368B685M035AS	
C4	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C5	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C6	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C7	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C8	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C9	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C10	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C11	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C12	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C13	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C14	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C15	299243-1	5	CAPACITOR, 0.001μF	CK60AW102M	
C16	299240-7	1	CAPACITOR, 3.3μF	T368B335M035AS	
C17	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C18	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C19	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C20	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C21	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C22	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C23	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C24	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C25	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C26	299243-1		CAPACITOR, 0.001μF	CK60AW102M	
C27	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C28	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C29	299243-1		CAPACITOR, 0.001μF	CK60AW102M	
C30	299240-3	2	CAPACITOR, 10μF	T368B106M020AS	
C31	299243-1		CAPACITOR, 0.001μF	CK60AW102M	
C32	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C33	299243-1		CAPACITOR, 0.001μF	CK60AW102M	
C34	299240-3		CAPACITOR, 10μF	T368B106M020AS	
C35	299240-9	1	CAPACITOR, 150μF	T362D157M015AS	
C36	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C37	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C38	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C39	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C40	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C41	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C42	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C43	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
CR1	299251-1	14	DIODE	1N4009	
CR2	299251-1		DIODE	1N4009	
CR3	299251-1		DIODE	1N4009	
CR4	299251-1		DIODE	1N4009	
CR5	299251-1		DIODE	1N4009	
CR6	299251-1		DIODE	1N4009	
CR7	299251-1		DIODE	1N4009	
CR8	293200-1	1	DIODE	1N645	
CR9	299251-1		DIODE	1N4009	
CR10	299251-1		DIODE	1N4009	
CR11	299251-1		DIODE	1N4009	
CR12	299251-1		DIODE	1N4009	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A11CR13	299251-1		DIODE	1N4009	7-33
CR14	299251-1		DIODE	1N4009	
CR15	299251-1		DIODE	1N4009	
J1	294454-1	1	HEADER, RIGHT ANGLE, 36 PIN	1-87230-8	
MP1	294968-2	1	EJECTOR, WHITE	5005-08N	
Q1	294162-1	2	TRANSISTOR	2N4922	
Q2	294161-1	2	TRANSISTOR	2N4919	
Q3	294162-1		TRANSISTOR	2N4922	
Q4	294161-1		TRANSISTOR	2N4919	
Q5	294156-1	1	TRANSISTOR	2N4392	
Q6	294151-1	1	TRANSISTOR	2N4124	
Q7	294153-1	1	TRANSISTOR	2N4126	
R1	299709-421	13	RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R2	299701-915	1	RESISTOR, 9.1M, 1/4W	RC07GF915J	
R3	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R4	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R5	299709-481	2	RESISTOR, 41.2K, 1/8W, 1%	RN60C4122F	
R6	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R7	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R8	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R9	299701-102	4	RESISTOR, 1K, 1/4W	RC07GF102J	
R10	299709-481		RESISTOR, 41.2K, 1/8W, 1%	RN60C4122F	
R11	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002J	
R12	299745-8	1	RESISTOR, VARIABLE, 2K	3009P-1-202	
R13	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R14	299701-103	3	RESISTOR, 10K, 1/4W	RC07GF103J	
R15	299709-681	1	RESISTOR, 26.7K, 1/8W, 1%	RN60C2672F	
R16	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R17	299701-104	3	RESISTOR, 100K, 1/4W	RC07GF104J	
R18	299745-9	1	RESISTOR, VARIABLE, 5K	3009P-502	
R19	299709-4	1	RESISTOR, 14.3K, 1/8W, 1%	RN60C1432F	
R20	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R21	299745-7	1	RESISTOR, VARIABLE, 1K	3009P-1-102	
R22	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R23	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002J	
R24	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002J	
R25	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002J	
R26	299709-441	2	RESISTOR, 16.2K, 1/8W, 1%	RN60C1622F	
R27	299709-450	3	RESISTOR, 20K, 1/8W, 1%	RN60C2002F	
R28	299709-450		RESISTOR, 20K, 1/8W, 1%	RN60C2002F	
R29			NOT USED		
R30			NOT USED		
R31			NOT USED		
R32			NOT USED		
R33	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R34	299709-391	1	RESISTOR, 4.99K, 1/8W, 1%	RN60C499F	
R35	299709-441		RESISTOR, 16.2K, 1/8W, 1%	RN60C1622F	
R36			NOT USED		
R37	299709-450		RESISTOR, 20K, 1/8W, 1%	RN60C2002F	
R38	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R39	299701-182	1	RESISTOR, 1.8K, 1/4W	RC07GF182J	
R40	299701-223	1	RESISTOR, 22K, 1/4W	RC07GF223J	
R41	299701-472	3	RESISTOR, 4.7K, 1/4W	RC07GF472J	
R42	299745-10	2	RESISTOR, VARIABLE, 10K	3009P-1-103	
R43	299745-10		RESISTOR, VARIABLE, 10K	3009P-1-103	
R44	299709-322	4	RESISTOR, 1K, 1/8W, 1%	RN60C1001F	
R45	299709-322		RESISTOR, 1K, 1/8W, 1%	RN60C1001F	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A11R46	299701-104		RESISTOR, 100K, 1/4W	RC07GF104J	7-33
R47	299701-104		RESISTOR, 100K, 1/4W	RC07GF104J	
R48	299701-511	1	RESISTOR, 510Ω, 1/4W	RC07GF511J	
R49	299709-322		RESISTOR, 1K, 1/8W, 1%	RN60C1001F	
R50	299709-322		RESISTOR, 1K, 1/8W, 1%	RN60C1001F	
R51	299701-512	1	RESISTOR, 5.1K, 1/4W	RC07GF512J	
R52	299709-518	1	RESISTOR, 100K, 1/8W, 1%	RC60C1003F	
R53	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R54	299701-472		RESISTOR, 4.7K, 1/4W	RC07GF472J	
R55	299701-333	1	RESISTOR, 33K, 1/4W	RC07GF333J	
R56	299701-163	1	RESISTOR, 16K, 1/4W	RC07GF163J	
R57	299701-302	1	RESISTOR, 3K, 1/4W	RC07GF302J	
R58	299701-392	3	RESISTOR, 3.9K, 1/4W	RC07GF392J	
R59	299701-392		RESISTOR, 3.9K, 1/4W	RC07GF392J	
R60	299701-472	1	RESISTOR, 4.7K, 1/4W	RC07GF472J	
R61	299701-392		RESISTOR, 3.9K, 1/4W	RC07GF392J	
R62	299701-472		RESISTOR, 4.7K, 1/4W	RC07GF472J	
R63	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R64	299701-221	1	RESISTOR, 220Ω, 1/4W	RC07GF221J	
TP1	293310-1	4	TERMINAL	1597-2-01	
TP2	293310-1		TERMINAL	1597-2-01	
TP3			NOT USED		
TP4	293310-1		TERMINAL	1597-2-01	
TP5	293310-1		TERMINAL	1597-2-01	
XQ5	293999-1	1	TRANSIPAD	10216DAP	
XZ1			NOT USED		
XZ2	294565-1	9	SOCKET, IC, 8 PIN	C930810	
XZ3	294565-1		SOCKET, IC, 8 PIN	C930810	
XZ4	294573-1	7	SOCKET, IC, 14 PIN	C931410	
XZ5	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ6	294565-1		SOCKET, IC, 8 PIN	C930810	
XZ7	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ8	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ9	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ10	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ11	294565-1		SOCKET, IC, 8 PIN	C930810	
XZ12	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ13	294565-1		SOCKET, IC, 8 PIN	C930810	
XZ14	294565-1		SOCKET, IC, 8 PIN	C930810	
XZ15	294565-1		SOCKET, IC, 8 PIN	C930810	
XZ16	294565-1		SOCKET, IC, 8 PIN	C930810	
XZ17	294565-1		SOCKET, IC, 8 PIN	C930810	
Z1			NOT USED		
Z2	293354-1	9	INTEGRATED CIRCUIT	N5741V	
Z3	293354-1		INTEGRATED CIRCUIT	N5741V	
Z4	293462-1	4	INTEGRATED CIRCUIT	SN72710N	
Z5	293462-1		INTEGRATED CIRCUIT	SN72710N	
Z6	293354-1		INTEGRATED CIRCUIT	N5741V	
Z7	293366-1	3	INTEGRATED CIRCUIT	SN7400N	
Z8	293462-1		INTEGRATED CIRCUIT	SN72710N	
Z9	293366-1		INTEGRATED CIRCUIT	SN7400N	
Z10	293366-1		INTEGRATED CIRCUIT	SN7400N	
Z11	293354-1		INTEGRATED CIRCUIT	N5741V	
Z12	293462-1		INTEGRATED CIRCUIT	SN72710N	
Z13	293354-1		INTEGRATED CIRCUIT	N5741V	
Z14	293354-1		INTEGRATED CIRCUIT	N5741V	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A11Z15	293354-1		INTEGRATED CIRCUIT	N5741V	7-33
Z16	293354-1		INTEGRATED CIRCUIT	N5741V	
Z17	293354-1		INTEGRATED CIRCUIT	N5741V	
1A12	296202-1	1	PROCESSED VIDEO PCB ASSEMBLY	296202-1	7-34
C1	299240-1	5	CAPACITOR, 6.8μF	T368B685M035AS	
C2	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C3	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C4	299244-1	10	CAPACITOR, 0.01μF	5HKS-S10	
C5	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C6	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C7	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C8	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C9	293802-1	2	CAPACITOR, 10pF	DD-100	
C10	293802-1		CAPACITOR, 10pF	DD-100	
C11	293810-1	1	CAPACITOR, 0.003μF	DD-302	
C12	294284-1	2	CAPACITOR, 0.02μF	562CZ5UBA101AH203M	
C13	299245-1	1	CAPACITOR, 0.1μF	8121-050-651-104M	
C14	299243-1	4	CAPACITOR, 0.001μF	CK60	
C15	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C16	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C17	299243-1		CAPACITOR, 0.001μF	CK60	
C18	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C19	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C20	294284-1		CAPACITOR, 0.02μF	562CZ5UBA101AH203M	
C21	293821-1	1	CAPACITOR, 30pF	DD300	
C22	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C23	299243-1		CAPACITOR, 0.001μF	CK60	
C24	299243-1		CAPACITOR, 0.001μF	CK60	
C25	299244-1		CAPACITOR, 0.01μF	5HKS-S10	
C26	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
CR1	299251-1	9	DIODE	1N4009	
CR2	299251-1		DIODE	1N4009	
CR3	299251-1		DIODE	1N4009	
CR4	299251-1		DIODE	1N4009	
CR5	299251-1		DIODE	1N4009	
CR6	299251-1		DIODE	1N4009	
CR7	299251-1		DIODE	1N4009	
CR8	299251-1		DIODE	1N4009	
CR9	299251-1		DIODE	1N4009	
CR10	293238-1	1	DIODE	1N825A	
CR11	114233-2	2	DIODE	1N2071	
CR12	114233-2		DIODE	1N2071	
J1	299933-1	1	HEADER, RIGHT ANGLE, 26 PIN	1-87230-3	
MP1	294968-2	1	EJECTOR, WHITE	5005-08N	
Q1	294153-1	3	TRANSISTOR	2N4126	
Q2	294153-1		TRANSISTOR	2N4126	
Q3	294151-1	12	TRANSISTOR	2N4124	
Q4	294153-1		TRANSISTOR	2N4126	
Q5	294151-1		TRANSISTOR	2N4124	
Q6	294151-1		TRANSISTOR	2N4124	
Q7			NOT USED		
Q8	294151-1		TRANSISTOR	2N4124	
Q9	294151-1		TRANSISTOR	2N4124	
Q10	294151-1		TRANSISTOR	2N4124	
Q11	294156-1	5	TRANSISTOR	2N4392	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A12Q12	294156-1		TRANSISTOR	2N4392	7-34
Q13	294156-1		TRANSISTOR	2N4392	
Q14	294156-1		TRANSISTOR	2N4392	
Q15	294151-1		TRANSISTOR	2N4124	
Q16	294151-1		TRANSISTOR	2N4124	
Q17	294151-1		TRANSISTOR	2N4124	
Q18	294156-1		TRANSISTOR	2N4392	
Q19	294151-1		TRANSISTOR	2N4124	
Q20	294157-1	1	TRANSISTOR	2N4401	
Q21	294158-1	1	TRANSISTOR	2N4403	
Q22	294151-1		TRANSISTOR	2N4124	
Q23			NOT USED		
Q24	294151-1		TRANSISTOR	2N4124	
R1	299701-101	3	RESISTOR, 100Ω, 1/4W	RC07GF101J	
R2	299712-340	2	RESISTOR, 280Ω, 1/4W, 1%	RN65C2800F	
R3	299709-227	2	RESISTOR, 121Ω, 1/8W, 1%	RN60C1210F	
R4	299701-101		RESISTOR, 100Ω, 1/4	RC07GF101J	
R5	299709-411	1	RESISTOR, 7.87K, 1/8W, 1%	RN60C7871F	
R6	299709-421	5	RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R7	299701-153	1	RESISTOR, 15K, 1/4W	RC07GF153J	
R8	299745-13	1	RESISTOR, VARIABLE, 50K	3009P-1-503	
R9	299701-103	13	RESISTOR, 10K, 1/4W	RC07GF103J	
R10	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R11	299701-473	7	RESISTOR, 47K, 1/4W	RC07GF473J	
R12	299717-314	1	RESISTOR, 154Ω, 1/2W, 1%	RN70C1540F	
R13	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R14	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R15	299709-227		RESISTOR, 121Ω, 1/8W, 1%	RN60C1210F	
R16	299701-473		RESISTOR, 47K, 1/4W	RC07GF473J	
R17	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R18	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R19	299701-473		RESISTOR, 47K, 1/4W	RC07GF473J	
R20			NOT USED		
R21	299712-340		RESISTOR, 280Ω, 1/4W, 1%	RN65C2800F	
R22	299745-9	2	RESISTOR, VARIABLE, 5K	3009P-1-502	
R23	299701-202	1	RESISTOR, 2K, 1/4W	RC07GF202J	
R24	299745-10	5	RESISTOR, VARIABLE, 10K	3009P-1-103	
R25	299745-10		RESISTOR, VARIABLE, 10K	3009P-1-103	
R26	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R27	299709-450	2	RESISTOR, 20K, 1/4W, 1%	RN60C2002F	
R28	299709-551	1	RESISTOR, 221K, 1/8W, 1%	RN60C2213F	
R29	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R30	299709-450		RESISTOR, 20K, 1/4W, 1%	RN60C2002F	
R31	299745-10		RESISTOR, VARIABLE, 10K	3009P-1-103	
R32	299745-10		RESISTOR, VARIABLE, 10K	3009P-1-103	
R33	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R34	299701-102	10	RESISTOR, 1K, 1/4W	RC07GF102J	
R35			NOT USED		
R36	299745-9		RESISTOR, VARIABLE, 5K	3009P-1-502	
R37	299701-362	3	RESISTOR, 3.6K, 1/4W	RC07GF362J	
R38	299701-104	6	RESISTOR, 100K, 1/4W	RC07GF104J	
R39	299701-302	3	RESISTOR, 3K, 1/4W	RC07GF302J	
R40	299701-104		RESISTOR, 100K, 1/4W	RC07GF104J	
R41	299701-302		RESISTOR, 3K, 1/4W	RC07GF302J	
R42	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R43	299701-473		RESISTOR, 47K, 1/4W	RC07GF473J	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A12R44	299701-472	1	RESISTOR, 4.7K, 1/4W	RC07GF472J	7-34
R45	299701-473		RESISTOR, 47K, 1/4W	RC07GF473J	
R46	299701-302		RESISTOR, 3K, 1/4W	RC07GF302J	
R47	299745-10		RESISTOR, VARIABLE, 10K	3009P-1-103	
R48	299701-473		RESISTOR, 47K, 1/4W	RC07GF473J	
R49	299701-103		RESISTOR, 10K, 1/4W	RC079F103J	
R50	299701-104		RESISTOR, 100K, 1/4W	RC07GF104J	
R51	299701-104		RESISTOR, 100K, 1/4W	RC07GF104J	
R52	299701-104		RESISTOR, 100K, 1/4W	RC07GF104J	
R53	299701-124	1	RESISTOR, 120K, 1/4W	RC07GF124J	
R54	299701-511	2	RESISTOR, 510Ω, 1/4W	RC07GF511J	
R55	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R56	299701-511		RESISTOR, 510Ω, 1/4W	RC07GF511J	
R57	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R58	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R59	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R60	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R61	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R62	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R63	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R64	299701-362		RESISTOR, 3.6K, 1/4W	RC07GF362J	
R65	299701-203	2	RESISTOR, 20K, 1/4W	RC07GF203J	
R66	299701-362		RESISTOR, 3.6K, 1/4W	RC07GF362J	
R67	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R68	299701-203		RESISTOR, 20K, 1/4W	RC07GF203J	
R69	299701-104		RESISTOR, 100K, 1/4W	RC07GF104J	
R70	299701-112	1	RESISTOR, 1.1K, 1/4W	RC07GF112J	
R71	299701-152	2	RESISTOR, 1.5K, 1/4W	RC07GF152J	
R72	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R73	299701-911	2	RESISTOR, 910Ω, 1/4W	RC07GF911J	
R74	299701-271	1	RESISTOR, 270Ω, 1/4W	RC07GF271J	
R75	299701-241	1	RESISTOR, 240Ω, 1/4W	RC07GF241J	
R76	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R77	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R78	299701-102		RESISTOR, 1K, 1/4W	RC07GF102J	
R79	299701-152		RESISTOR, 1.5K, 1/4W	RC07GF152J	
R80	299701-100	1	RESISTOR, 10Ω, 1/4W	RC07GF100J	
R81			NOT USED		
R82	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R83			NOT USED		
R84	299701-911		RESISTOR, 910Ω, 1/4W	RC07GF911J	
R85	299701-101		RESISTOR, 100Ω, 1/4W	RC07GF101J	
R86			NOT USED		
R100	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
TP1	293310-1	3	TERMINAL	1597-2-01	
TP2	293310-1		TERMINAL	1597-2-01	
TP3	293310-1		TERMINAL	1597-2-01	
XQ11	293999-1	5	TRANSIPAD	10216	
XQ12	293999-1		TRANSIPAD	10216	
XQ13	293999-1		TRANSIPAD	10216	
XQ14	293999-1		TRANSIPAD	10216	
XQ18	293999-1		TRANSIPAD	10216	
XZ1	294565-1	3	SOCKET, IC, 8 PIN	C930810	
XZ2	294565-1		SOCKET, IC, 8 PIN	C930810	
XZ3	294565-1		SOCKET, IC, 8 PIN	C930810	
XZ4	294573-1	3	SOCKET, IC, 14 PIN	C931410	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A12XZ5	294573-1		SOCKET, IC, 14 PIN	C931410	7-34
XZ6	294573-1		SOCKET, IC, 14 PIN	C931410	
Z1	293391-1	3	INTEGRATED CIRCUIT	LM741CN	
Z2	293391-1		INTEGRATED CIRCUIT	LM741CN	
Z3	293391-1		INTEGRATED CIRCUIT	LM741CN	
Z4	294498-2	1	INTEGRATED CIRCUIT	LM308D	
Z5	293462-1	1	INTEGRATED CIRCUIT	SN72710N	
Z6	293366-1	1	INTEGRATED CIRCUIT	SN7400N	
1A13	296204-1	1	REGULATOR BIAS PCB ASSEMBLY	296204-1	7-35
C1	299240-4	3	CAPACITOR, 100μF	T362D-107M020AS	
C2	299240-1	5	CAPACITOR, 6.8μF	T368B685M035AS	
C3	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C4	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C5	299244-1	10	CAPACITOR, .01μF	5HKS-S10	
C6	299244-1		CAPACITOR, .01μF	5HKS-S10	
C7	299244-1		CAPACITOR, .01μF	5HKS-S10	
C8	299245-9	6	CAPACITOR, .1μF	8131-M108-X7R0-104K	
C9	299240-4		CAPACITOR, 100μF	T362D-107M020AS	
C10	299244-1		CAPACITOR, .01μF	5HKS-S10	
C11	299245-9		CAPACITOR, .1μF	8131-M108-X7R0-104K	
C12	299245-9		CAPACITOR, .1μF	8131-M108-X7R0-104K	
C13	293920-1	1	CAPACITOR, 27μF	CS13BC276K	
C14	299240-4		CAPACITOR, 100μF	T362D-107M020AS	
C15	299244-1		CAPACITOR, .01μF	5HKS-S10	
C16	299245-9		CAPACITOR, .1μF	8131-M108-X7R0-104K	
C17	299244-1		CAPACITOR, .01μF	5HKS-S10	
C18	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C19	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C20	299244-1		CAPACITOR, .01μF	5HKS-S10	
C21	299244-1		CAPACITOR, .01μF	5HKS-S10	
C22	299244-1		CAPACITOR, .01μF	5HKS-S10	
C23	299245-9		CAPACITOR, .1μF	8131-M108-X7R0-104K	
C24	299245-9		CAPACITOR, .1μF	8131-M108-X7R0-104K	
C25	299244-1		CAPACITOR, .01μF	5HKS-S10	
CR1	299251-1	8	DIODE	1N4009	
CR2	299251-1		DIODE	1N4009	
CR3	299251-1		DIODE	1N4009	
CR4	299251-1		DIODE	1N4009	
CR5	299251-1		DIODE	1N4009	
CR6	293263-1	1	DIODE	1N5234B	
CR7	299251-1		DIODE	1N4009	
CR8	293266-1	1	DIODE	1N5243B	
CR9	293262-1	1	DIODE	1N5231B	
CR10	293238-1	1	DIODE	1N825A	
CR11	293204-1	2	DIODE	1N3024B	
CR12	293204-1		DIODE	1N3024B	
CR13	299251-1		DIODE	1N4009	
CR14	299251-1		DIODE	1N4009	
E1	293310-1	7	TERMINAL	1597-2-01	
E2	293310-1		TERMINAL	1597-2-01	
J1	294454-1	1	HEADER, RIGHT ANGLE, 36 PIN	1-87230-8	
K1	294776-1	1	RELAY	GB835C-6	
MP1	294968-2	1	EJECTOR, WHITE	5005-08N	
Q1	294155-1	1	TRANSISTOR	2N4235	
Q2	294161-1	2	TRANSISTOR	2N4919	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A13Q3	294162-1	1	TRANSISTOR	2N4922	7-35
Q4	294153-1	2	TRANSISTOR	2N4126	
Q5	294157-1	1	TRANSISTOR	2N4401	
Q6			NOT USED		
Q7	294153-1		TRANSISTOR	2N4126	
Q8	294161-1		TRANSISTOR	2N4919	
R1	299701-153	1	RESISTOR, 15K, 1/4W	RC07GF153J	
R2	299745-10	6	RESISTOR, VARIABLE, 10K	3009P-1-103	
R3	299745-10		RESISTOR, VARIABLE, 10K	3009P-1-103	
R4	299745-10		RESISTOR, VARIABLE, 10K	3009P-1-103	
R5	299745-10		RESISTOR, VARIABLE, 10K	3009P-1-103	
R6	299745-10		RESISTOR, VARIABLE, 10K	3009P-1-103	
R7	299702-102	1	RESISTOR, 1K, 1/2W	RC20GF102J	
R8	299701-112	1	RESISTOR, 1.1K, 1/4W	RC07GF112J	
R9	299701-102	1	RESISTOR, 1K, 1/4W	RC07GF102J	
R10	299709-339	1	RESISTOR, 1.5K, 1/8W, 1%	RN60C1501F	
R11	299701-122	1	RESISTOR, 1.2K, 1/4W	RC07GF122J	
R12	299702-101	2	RESISTOR, 100Ω, 1/2W	RC20GF101J	
R13	299709-368	1	RESISTOR, 3.01K, 1/8W, 1%	RN60C3011F	
R14	299709-326	1	RESISTOR, 1.1K, 1/8W, 1%	RN60C1101F	
R15	299745-10		RESISTOR, VARIABLE, 10K	3009P-1-103	
R16	299701-471	1	RESISTOR, 470Ω, 1/4W	RC07GF471J	
R17	299701-241	1	RESISTOR, 240Ω, 1/4W	RC07GF241J	
R18	299701-391	1	RESISTOR, 390Ω, 1/4W	RC07GF391J	
R19	299701-203	1	RESISTOR, 20K, 1/4W	RC07GF203J	
R20	299702-101		RESISTOR, 100Ω, 1/2W	RC20GF101J	
R21	299709-351	1	RESISTOR, 2K, 1/8W, 1%	RN60C2001F	
R22	299709-287	1	RESISTOR, 464Ω, 1/8W, 1%	RN60C4640F	
R23	299709-369	3	RESISTOR, 3.09K, 1/8W, 1%	RN60C3091F	
R24	299709-369		RESISTOR, 3.09K, 1/8W, 1%	RN60C3091F	
R25	299709-369		RESISTOR, 3.09K, 1/8W, 1%	RN60C3091F	
R26	299709-400	1	RESISTOR, 6.04K, 1/8W, 1%	RN60C6041F	
R27	299709-421	3	RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R28	299704-180	2	RESISTOR, 18Ω, 2W	RC42GF180J	
R29	299701-101	3	RESISTOR, 100Ω, 1/4W	RC07GF101J	
R30	299709-360	1	RESISTOR, 2.49K, 1/8W, 1%	RN60C2491F	
R31	299704-360	1	RESISTOR, 36Ω, 2W	RC42GF360J	
R32	299709-367	1	RESISTOR, 2.94K, 1/8W, 1%	RN60C2941F	
R33	299701-101		RESISTOR, 100Ω, 1/4W	RC07GF101J	
R34	299709-396	1	RESISTOR, 5.49K, 1/8W, 1%	RN60C5491F	
R35	299745-9	1	RESISTOR, VARIABLE, 5K	3009P-1-502	
R36	299709-393	1	RESISTOR, 5.11K, 1/8W, 1%	RN60C5001F	
R37	299745-6	2	RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R38	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R39	299701-221	1	RESISTOR, 200Ω, 1/4W	RC07GF221J	
R40	299701-101		RESISTOR, 100Ω, 1/4W	RC07GF101J	
R41	299709-219	1	RESISTOR, 100Ω, 1/8W, 1%	RN60C1000F	
R42	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R43	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R44	299709-322	3	RESISTOR, 1K, 1/8W, 1%	RN60C1001F	
R45	299709-322		RESISTOR, 1K, 1/8W, 1%	RN60C1001F	
R46	299709-322		RESISTOR, 1K, 1/8W, 1%	RN60C1001F	
R47	299701-332	1	RESISTOR, 3.3K, 1/4W	RC07GF332J	
TP1	293310-1		TERMINAL	1597-2-01	
TP2	293310-1		TERMINAL	1597-2-01	
TP3	293310-1		TERMINAL	1597-2-01	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A13TP4	293310-1		TERMINAL	1597-2-01	7-35
TP5	293310-1		TERMINAL	1597-2-01	
VR1	294118-1	1	ZENER DIODE	2N1595	
XK1	294573		SOCKET, 14 PIN	C931410	
XZ1	294565	5	SOCKET, IC, 8 PIN	C930810	
XZ2	294565		SOCKET, IC, 8 PIN	C930810	
XZ3	294565		SOCKET, IC, 8 PIN	C930810	
XZ4	294565		SOCKET, IC, 8 PIN	C930810	
XZ5	294573	3	SOCKET, 14 PIN	C931410	
XZ6	294573		SOCKET, 14 PIN	C931410	
XZ7	294573		SOCKET, 14 PIN	C931410	
XZ8	294567	1	SOCKET, 16 PIN	C931610	
XZ9	294574	1	SOCKET, 18 PIN	C931810	
XZ10	294565		SOCKET, 8 PIN	C930810	
Z1	293354	5	INTEGRATED CIRCUIT	N5741V	
Z2	293354		INTEGRATED CIRCUIT	N5741V	
Z3	293354		INTEGRATED CIRCUIT	N5741V	
Z4	293354		INTEGRATED CIRCUIT	N5741V	
Z5	293366	1	INTEGRATED CIRCUIT	SN7400N	
Z6	293466	1	INTEGRATED CIRCUIT	SN74121N	
Z7	293409	1	D/A CONVERTER	MN3001	
Z8	293587	1	INTEGRATED CIRCUIT	SN74LS368N	
Z9	294593	1	A/D CONVERTER	AD571JD	
Z10	293354		INTEGRATED CIRCUIT	N5741V	
14	296206-1	1	DIGITAL DISPLAY #2 PC BOARD ASSEMBLY	296206-1	7-36
C1	299244-1	23	CAPACITOR, .01μF	5HKS-S10	
C2	299240-1	6	CAPACITOR, 6.8μF	T368B685M035AS	
C3	299244-1		CAPACITOR, .01μF	5HKS-S10	
C4	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C5	299244-1		CAPACITOR, .01μF	5HKS-S10	
C6	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C7	293920-1	2	CAPACITOR, 27μF	CS13BC276K	
C8	293920-1		CAPACITOR, 27μF	CS13BC276K	
C9	299244-1		CAPACITOR, .01μF	5HKS-S10	
C10	299244-1		CAPACITOR, .01μF	5HKS-S10	
C11	299244-1		CAPACITOR, .01μF	5HKS-S10	
C12	299244-1		CAPACITOR, .01μF	5HKS-S10	
C13	293290-1	1	CAPACITOR, .22μF	MCK-1862	
C14	299244-1		CAPACITOR, .01μF	5HKS-S10	
C15	299244-1		CAPACITOR, .01μF	5HKS-S10	
C16	299244-1		CAPACITOR, .01μF	5HKS-S10	
C17	299244-1		CAPACITOR, .01μF	5HKS-S10	
C18	299244-1		CAPACITOR, .01μF	5HKS-S10	
C19			NOT USED		
C20	299244-1		CAPACITOR, .01μF	5HKS-S10	
C21	299244-1		CAPACITOR, .01μF	5HKS-S10	
C22	299244-1		CAPACITOR, .01μF	5HKS-S10	
C23	299244-1		CAPACITOR, .01μF	5HKS-S10	
C24	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C25			NOT USED		
C26			NOT USED		
C27	299244-1		CAPACITOR, .01μF	5HKS-S10	
C28	299244-1		CAPACITOR, .01μF	5HKS-S10	
C29	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C30	299244-1		CAPACITOR, .01μF	5HKS-S10	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figu No.
1A14C31	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	7-36
C32	299244-1		CAPACITOR, .01μF	5HKS-S10	
C33	299244-1		CAPACITOR, .01μF	5HKS-S10	
C34	299244-1		CAPACITOR, .01μF	5HKS-S20	
C35	299244-1		CAPACITOR, .01μF	5HKS-S20	
C36	293294-2	1	CAPACITOR, .01μF	CY20C104P	
CR1	299251-1	5	DIODE	1N4009	
CR2	299251-1		DIODE	1N4009	
CR3	299251-1		DIODE	1N4009	
CR4	299251-1		DIODE	1N4009	
CR5	299251-1		DIODE	1N4009	
J1	299935-1	1	HEADER, RIGHT ANGLE, 16 PIN	AMP87230-8	
MP1	294968-2	1	EJECTOR, WHITE	5005-08N	
Q1	294156-1	1	TRANSISTOR	2N4392	
Q2	294151-1	1	TRANSISTOR	2N4124	
Q3	294153-1	1	TRANSISTOR	2N4126	
R1	299701-202	1	RESISTOR, 2K, 1/4W	RC07GF202J	
R2	299701-152	2	RESISTOR, 1.5K, 1/4W	RC07GF152J	
R3	299701-153	2	RESISTOR, 15K, 1/4W	RC07GF153J	
R4	299709-339	1	RESISTOR, 1.5K, 1/8W, 1%	RN60C1501F	
R5	299709-450	1	RESISTOR, 20K, 1/8W, 1%	RN60C2002F	
R6	299701-475	1	RESISTOR, 4.7M, 1/4W	RC07GF475J	
R7	299701-186	1	RESISTOR, 18M, 1/4W	RC07GF186J	
R8	299709-498	1	RESISTOR, 61.9K, 1/8W, 1%	RN60C6192F	
R9	299709-403	1	RESISTOR, 6.49K, 1/8W, 1%	RN60C6491F	
R10	299701-153		RESISTOR, 15K, 1/4W	RC07GF153J	
R11	299709-421	4	RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R12	299709-417	1	RESISTOR, 9.09K, 1/8W, 1%	RN60C9091F	
R13	299709-433	1	RESISTOR, 13.3K, 1/8W, 1%	RN60C1332F	
R14	299701-104	2	RESISTOR, 100K, 1/4W	RC07GF104J	
R15	299701-104		RESISTOR, 100K, 1/4W	RC07GF104J	
R16	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R17	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R18	299709-441	1	RESISTOR, 16.2K, 1/8W, 1%	RN60C1622F	
R19	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R20	299701-242	1	RESISTOR, 2.4K, 1/4W	RC07GF242J	
R21	299709-219	2	RESISTOR, 100Ω, 1/8W, 1%	RN60C1000F	
R22	299709-681	1	RESISTOR, 26.7K, 1/8W, 1%	RN60C2672F	
R23	299701-472	2	RESISTOR, 4.7K, 1/4W	RC07GF472J	
R24	299701-103	1	RESISTOR, 10K, 1/4W	RC07GF103J	
R25	299709-219		RESISTOR, 100Ω, 1/8W, 1%	RN60C1000F	
R26	299709-386	1	RESISTOR, 4.64K, 1/8W, 1%	RN60C4641F	
R27	299709-438	1	RESISTOR, 15K, 1/8W, 1%	RN60C1502F	
R28	299701-163	1	RESISTOR, 16K, 1/4W	RC07GF163J	
R29	299709-442	1	RESISTOR, 16.5K, 1/8W, 1%	RN60C1652F	
R30	299709-391	1	RESISTOR, 4.99K, 1/8W, 1%	RN60C4991F	
R31	299709-490	1	RESISTOR, 51.1K, 1/8W, 1%	RN60C5112F	
R32	299701-302	1	RESISTOR, 3K, 1/4W	RC07GF302J	
R33	299701-102	1	RESISTOR, 1K, 1/4W	RC07GF102J	
R34	299701-472		RESISTOR, 4.7K, 1/4W	RC07GF472J	
R35			NOT USED		
R36	299701-152		RESISTOR, 1.5K, 1/4W	RC07GF152J	
TP1	293310-1	3	TERMINAL	CTC-1597-2-01	
TP2	293310-1		TERMINAL	CTC-1597-2-01	
TP3	293310-1		TERMINAL	CTC-1597-2-01	
XZ1	294565-1	4	SOCKET, IC, 8 PIN	C930810	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A14XZ2	294565-1		SOCKET, IC, 8 PIN	C930810	7-36
XZ3	294573-1	7	SOCKET, IC, 14 PIN	C931410	
XZ4	294499-1	3	SOCKET, IC, 8 PIN	8058-1649	
XZ5	294499-1		SOCKET, IC, 8 PIN	8058-1649	
XZ6	294565-1		SOCKET, IC, 8 PIN	C930810	
XZ7	294565-1		SOCKET, IC, 8 PIN	C930810	
XZ8	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ9	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ10			NOT USED		
XZ11	294567-1	1	SOCKET, IC, 16 PIN	C931610	
XZ12	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ13	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ14	294499-1		SOCKET, IC, 8 PIN	8058-1649	
XZ15	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ16	294573-1		SOCKET, IC, 14 PIN	C931410	
Z1	293354-1	4	INTEGRATED CIRCUIT	N5741V	
Z2	293354-1		INTEGRATED CIRCUIT	N5741V	
Z3	293462-1	2	INTEGRATED CIRCUIT	SN72710N	
Z4	293485-1	3	INTEGRATED CIRCUIT	U5B991429	
Z5	293485-1		INTEGRATED CIRCUIT	U5B991429	
Z6	293354-1		INTEGRATED CIRCUIT	N5741V	
Z7	293354-1		INTEGRATED CIRCUIT	N5741V	
Z8	293462-1		INTEGRATED CIRCUIT	SN72710N	
Z9	293366-1	2	INTEGRATED CIRCUIT	SN7400N	
Z10			NOT USED		
Z11	293456-1	1	INTEGRATED CIRCUIT	SN7476N	
Z12	293451-1	2	INTEGRATED CIRCUIT	SN7440N	
Z13	293366-1		INTEGRATED CIRCUIT	SN7400N	
Z14	293485-1		INTEGRATED CIRCUIT	U5B991429	
Z15	293451-1		INTEGRATED CIRCUIT	SN7440N	
Z16	293536-1	1	INTEGRATED CIRCUIT	SN74LS74N	
1A15	296208-1	1	DIGITAL DISPLAY #1 PC BOARD ASSEMBLY	296208-1	7-37
C1	299240-1	2	CAPACITOR, 6.8µF	T368B685M035AS	
C2	299244-1	11	CAPACITOR, .01µF	5HKS-S10	
C3	299244-1		CAPACITOR, .01µF	5HKS-S10	
C4	299244-1		CAPACITOR, .01µF	5HKS-S10	
C5	299244-1		CAPACITOR, .01µF	5HKS-S10	
C6	299244-1		CAPACITOR, .01µF	5HKS-S10	
C7	299244-1		CAPACITOR, .01µF	5HKS-S10	
C8	299240-1		CAPACITOR, 6.8µF	T368B685M035AS	
C9	299244-1		CAPACITOR, .01µF	5HKS-S10	
C10	299244-1		CAPACITOR, .01µF	5HKS-S10	
C11	299244-1		CAPACITOR, .01µF	5HKS-S10	
C12	299244-1		CAPACITOR, .01µF	5HKS-S10	
C13	299244-1		CAPACITOR, .01µF	5HKS-S10	
J1	294213-1	1	HEADER, RIGHT ANGLE, 10 PIN	87230-5	
J2	299933-1	2	HEADER, RIGHT ANGLE, 26 PIN	1-87230-3	
J3	299933-1		HEADER, RIGHT ANGLE, 26 PIN	1-87230-3	
MP1	294968-2	1	EJECTOR, WHITE	5005-08N	
R1	299701-470	1	RESISTOR, 47Ω, 1/4W	RC07GF470J	
R2	299701-102	1	RESISTOR, 1K, 1/4W	RC07GF102J	
TP1	293310-1	1	TERMINAL	CTC-1597-2-01	
XZ1	294573-1	14	SOCKET, IC, 14 PIN	C931410	
XZ2	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ3	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ4	294573-1		SOCKET, IC, 14 PIN	C931410	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A15XZ5	294573-1		SOCKET, IC, 14 PIN	C931410	7-37
XZ6	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ7	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ8	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ9	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ10	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ11	294567-1	10	SOCKET, IC, 16 PIN	C931610	
XZ12	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ13	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ14	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ15	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ16	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ17	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ18	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ19	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ20	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ21	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ22	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ23	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ24	294573-1		SOCKET, IC, 14 PIN	C931410	
Z1	293366-1	2	INTEGRATED CIRCUIT	SN7400N	
Z2	293366-1		INTEGRATED CIRCUIT	SN7400N	
Z3	293691-5	5	RESISTOR NETWORK, 220Ω	314B221	
Z4	293691-5		RESISTOR NETWORK, 220Ω	314B221	
Z5	293691-5		RESISTOR NETWORK, 220Ω	314B221	
Z6	293691-5		RESISTOR NETWORK, 220Ω	314B221	
Z7	293691-5		RESISTOR NETWORK, 220Ω	314B221	
Z8	293475-1	5	INTEGRATED CIRCUIT	SN74176N	
Z9	293364-1	1	INTEGRATED CIRCUIT	SN7404N	
Z10	293447-1	1	INTEGRATED CIRCUIT	SN7420N	
Z11	293452-1	5	INTEGRATED CIRCUIT	SN7447N	
Z12	293452-1		INTEGRATED CIRCUIT	SN7447N	
Z13	293452-1		INTEGRATED CIRCUIT	SN7447N	
Z14	293452-1		INTEGRATED CIRCUIT	SN7447N	
Z15	293452-1		INTEGRATED CIRCUIT	SN7447N	
Z16	293475-1		INTEGRATED CIRCUIT	SN74176N	
Z17	293475-1		INTEGRATED CIRCUIT	SN74176N	
Z18	293475-1		INTEGRATED CIRCUIT	SN74176N	
Z19	293455-1	5	INTEGRATED CIRCUIT	SN7475N	
Z20	293455-1		INTEGRATED CIRCUIT	SN7475N	
Z21	293455-1		INTEGRATED CIRCUIT	SN7475N	
Z22	293455-1		INTEGRATED CIRCUIT	SN7475N	
Z23	293455-1		INTEGRATED CIRCUIT	SN7475N	
Z24	293475-1		INTEGRATED CIRCUIT	SN74176N	
1A16	296210-1	1	FREQ/PWR REF ENCODER PCB ASSEMBLY	296210-1	7-38
C1	299240-2	1	CAPACITOR, 22μF	T368B226M015AS	
C2	293294-2	9	CAPACITOR, 0.1μF	CY20C104P	
C3	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C4	293294-2		CAPACITOR, 0.1μF	CY20C214P	
C5	293294-2		CAPACITOR, 0.1μF	CY20C214P	
C6	293294-2		CAPACITOR, 0.1μF	CY20C214P	
C7	293294-2		CAPACITOR, 0.1μF	CY20C214P	
C8	293294-2		CAPACITOR, 0.1μF	CY20C214P	
C9	293294-2		CAPACITOR, 0.1μF	CY20C214P	
C10	293294-2		CAPACITOR, 0.1μF	CY20C214P	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A16J1	299935-1	2	HEADER, RIGHT ANGLE, 16 PIN	87230-8	7-38
J2	299933-1	1	HEADER, RIGHT ANGLE, 26 PIN	87230-3	
J3	299935-1		HEADER, RIGHT ANGLE, 16 PIN	87230-8	
MP1	294968-2	1	EJECTOR, WHITE	5005-08N	
R1	299700-102	1	RESISTOR, 1K, 1/8W	RC05GF102J	
R2	299700-103	3	RESISTOR, 10K, 1/8W	RC05GF103J	
R3	299700-103		RESISTOR, 10K, 1/8W	RC05GF103J	
R4	299700-103		RESISTOR, 10K, 1/8W	RC05GF103J	
XZ1	294573-1	8	SOCKET, IC, 14 PIN	C931410	
XZ2	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ3	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ4	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ5	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ6	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ7	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ8	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ9	294567-1	8	SOCKET, IC, 16 PIN	C931610	
XZ10	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ11	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ12	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ13	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ14	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ15	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ16	294567-1		SOCKET, IC, 16 PIN	C931610	
Z1	293446-1	5	INTEGRATED CIRCUIT	SN7416N	
Z2	293446-1		INTEGRATED CIRCUIT	SN7416N	
Z3	293446-1		INTEGRATED CIRCUIT	SN7416N	
Z4	293446-1		INTEGRATED CIRCUIT	SN7416N	
Z5	293446-1		INTEGRATED CIRCUIT	SN7416N	
Z6	293437-1	1	INTEGRATED CIRCUIT	SN74LS08N	
Z7	293541-1	1	INTEGRATED CIRCUIT	SN74LS00N-00	
Z8	293541-2	1	INTEGRATED CIRCUIT	SN74LS27N-00	
Z9	293541-3	6	INTEGRATED CIRCUIT	SN74LS251N-00	
Z10	293541-3		INTEGRATED CIRCUIT	SN74LS251N-00	
Z11	293541-3		INTEGRATED CIRCUIT	SN74LS251N-00	
Z12	293541-3		INTEGRATED CIRCUIT	SN74LS251N-00	
Z13	293541-3		INTEGRATED CIRCUIT	SN74LS251N-00	
Z14	293541-3		INTEGRATED CIRCUIT	SN74LS251N-00	
Z15	293588-1	2	INTEGRATED CIRCUIT	SN74LS253N	
Z16	293588-1		INTEGRATED CIRCUIT	SN74LS253N	
1A17	296496-2	1	CHARACTER GEN AND DATA ENCODER PCB ASSEMBLY	296496-2	7-39
C1	299240-2	1	CAPACITOR, 22μF	T368B226M015AS	
C2	299240-10	1	CAPACITOR, 33μF	T368B336M10AS	
C3	293294-2	14	CAPACITOR, 0.1μF	CY20C104P	
C4	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C5	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C6	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C7	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C8	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C9	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C10	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C11	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C12	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C13	293294-2		CAPACITOR, 0.1μF	CY20C104P	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A17C14	293294-2		CAPACITOR, 0.1μF	CY20C104P	7-39
C15	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C16	293294-2		CAPACITOR, 0.1μF	CY20C104P	
CR1	293240-1	9	DIODE	1N914	
CR2	293240-1		DIODE	1N914	
CR3	293240-1		DIODE	1N914	
CR4	293240-1		DIODE	1N914	
CR5	293240-1		DIODE	1N914	
CR6	293240-1		DIODE	1N914	
CR7	293240-1		DIODE	1N914	
CR8	293240-1		DIODE	1N914	
CR9	293240-1		DIODE	1N914	
J1	294213-4	1	HEADER, RIGHT ANGLE, 40 PIN	2-87230-0	
J2	299935-1	1	HEADER, RIGHT ANGLE, 16 PIN	87230-8	
MP1	294968-2	1	EJECTOR, WHITE	5005-08N	
Q1	294157-1	1	TRANSISTOR	2N4401	
R1	299700-103	2	RESISTOR, 10K, 1/8W	RC05GF103J	
R2	299700-103		RESISTOR, 10K, 1/8W	RC05GF103J	
R3	299700-332	2	RESISTOR, 3.3K, 1/8W	RC05GF332J	
R4	299700-104	1	RESISTOR, 100K, 1/8W	RC05GF104J	
R5	299700-152	7	RESISTOR, 1.5K, 1/8W	RC05GF152J	
R6	299700-152		RESISTOR, 1.5K, 1/8W	RC05GF152J	
R7	299700-152		RESISTOR, 1.5K, 1/8W	RC05GF152J	
R8	299700-152		RESISTOR, 1.5K, 1/8W	RC05GF152J	
R9	299700-152		RESISTOR, 1.5K, 1/8W	RC05GF152J	
R10	299700-152		RESISTOR, 1.5K, 1/8W	RC05GF152J	
R11	299700-152		RESISTOR, 1.5K, 1/8W	RC05GF152J	
R12	299700-752	3	RESISTOR, 7.5K, 1/8W	RC05GF752J	
R13	299700-752		RESISTOR, 7.5K, 1/8W	RC05GF752J	
R14	299700-752		RESISTOR, 7.5K, 1/8W	RC05GF752J	
R15	299700-301	4	RESISTOR, 300Ω, 1/8W	RC05GF301J	
R16	299700-301		RESISTOR, 300Ω, 1/8W	RC05GF301J	
R17	299700-301		RESISTOR, 300Ω, 1/8W	RC05GF301J	
R18	299700-301		RESISTOR, 300Ω, 1/8W	RC05GF301J	
R19	299700-112	2	RESISTOR, 1.1K, 1/8W	RC05GF112J	
R20	299700-112		RESISTOR, 1.1K, 1/8W	RC05GF112J	
R21	299700-201	2	RESISTOR, 200Ω, 1/8W	RC05GF201J	
R22	299700-201		RESISTOR, 200Ω, 1/8W	RC05GF201J	
R23	299700-332		RESISTOR, 3.3K, 1/8W	RC05GF332J	
XZ1	294573-1	10	SOCKET, IC, 14 PIN	C931410	
XZ2	294567-1	9	SOCKET, IC, 16 PIN	C931610	
XZ3	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ4	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ5	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ6	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ7	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ8	294595-1	5	SOCKET, IC, 20 PIN	C932010	
XZ9	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ10	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ11	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ12	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ13	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ14	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ15	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ16	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ17	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ18	294574-1		SOCKET, IC, 18 PIN	C931810	
XZ19	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ20	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ21	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ22	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ23	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ24	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ25	294573-1		SOCKET, IC, 14 PIN	C931410	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A17Z1	293541-4	1	INTEGRATED CIRCUIT	SN74LS125N	7-39
Z2	293541-5	1	INTEGRATED CIRCUIT	SN74LS139N	
Z3	293446-1	4	INTEGRATED CIRCUIT	SN7416N	
Z4	293446-1		INTEGRATED CIRCUIT	SN7416N	
Z5	293541-6	4	INTEGRATED CIRCUIT	SN74LS348N	
Z6	293541-6		INTEGRATED CIRCUIT	SN74LS348N	
Z7	293691-6	2	INTEGRATED CIRCUIT	316A103	
Z8	294596-2	1	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS471	
Z9	293541-7	3	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS244N	
Z10	294596-3	1	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS471N	
Z11	293437-1	1	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS08N	
Z12	293541-7		INTEGRATED CIRCUIT, PROGRAMMED	SN74LS244N	
Z13	293541-7		INTEGRATED CIRCUIT, PROGRAMMED	SN74LS244N	
Z14	293541-6		INTEGRATED CIRCUIT	SN74LS348N	
Z15	293541-6		INTEGRATED CIRCUIT	SN74LS348N	
Z16	293691-6		INTEGRATED CIRCUIT	316A103	
Z17	293541-1	2	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS00N	
Z18	294594-1	1	INTEGRATED CIRCUIT, PROGRAMMED	MCM6674P	
Z19	293544-1	1	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS20N	
Z20	293541-1		INTEGRATED CIRCUIT, PROGRAMMED	SN74LS00N	
Z21	293541-8	2	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS148N	
Z22	293540-1	1	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS04N	
Z23	293446-1		INTEGRATED CIRCUIT	SN7416N	
Z24	293541-8		INTEGRATED CIRCUIT, PROGRAMMED	SN74LS148N	
Z25	293446-1		INTEGRATED CIRCUIT	SN7416N	
A18	296214-1	1	HORIZONTAL TIMING PCB ASSEMBLY	296214-1	7-40
C1	299240-2	1	CAPACITOR, 22μF	T368B226M15AS	
C2	299241-050	1	CAPACITOR, 5pF	DM5CC-050D	
C3	293294-2	14	CAPACITOR, 0.1μF	CY20C104P	
C4	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C5	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C6	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C7	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C8	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C9	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C10	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C11	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C12	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C13	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C14	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C15	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C16	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C17	299871-102	1	CAPACITOR, 0.001μF	CK05BX102K	
CR1			NOT USED		
CR2	293240-1	4	DIODE	1N914	
CR3	293240-1		DIODE	1N914	
CR4	293240-1		DIODE	1N914	
CR5	293240-1		DIODE	1N914	
J1	294213-1	1	HEADER, RIGHT ANGLE, 10 PIN	87230-5	
MP1	294968-2	1	EJECTOR, WHITE	5005-08N	
Q1	294157-1	1	TRANSISTOR	2N4401	
R1	299700-102	5	RESISTOR, 1K, 1/8W	RC05GF102J	
R2	299700-102		RESISTOR, 1K, 1/8W	RC05GF102J	
R3	299700-102		RESISTOR, 1K, 1/8W	RC05GF102J	
R4	299700-101	1	RESISTOR, 100Ω, 1/8W	RC05GF101J	
R5	299700-361	1	RESISTOR, 360Ω, 1/8W	RC05GF361J	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A18R6	299700-102		RESISTOR, 1K, 1/8W	RC05GF102J	7-40
R7	299700-221	1	RESISTOR, 220Ω, 1/8W	RC05GF221J	
R8	299700-102		RESISTOR, 1K, 1/8W	RC05GF102J	
TP1	293310-1	2	TERMINAL	1597-2-01	
TP2	293310-1		TERMINAL	1597-2-01	
XZ1	294567-1	11	SOCKET, IC, 16 PIN	C931610	
XZ2	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ3	294573-1	11	SOCKET, IC, 14 PIN	C931410	
XZ4	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ5	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ6	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ7			NOT USED		
XZ8	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ9	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ10	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ11	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ12	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ13	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ14	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ15	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ16	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ17	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ18	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ19	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ20	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ21	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ22	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ23	294573-1		SOCKET, IC, 14 PIN	C931410	
Y1	230479-11	1	CRYSTAL, 4 MHZ	4MHZ	
Z1	293541-9	8	INTEGRATED CIRCUIT	SN74LS161N	
Z2	293541-9		INTEGRATED CIRCUIT	SN74LS161N	
Z3	293540-1	3	INTEGRATED CIRCUIT	SN74LS04N	
Z4	293541-12	1	INTEGRATED CIRCUIT	SN74LS01N	
Z5	293536-1	2	INTEGRATED CIRCUIT	SN74LS74N	
Z6	293541-9		INTEGRATED CIRCUIT	SN74LS161N	
Z7			NOT USED		
Z8	293541-10	1	INTEGRATED CIRCUIT	SN74LS124N	
Z9	293356-1	1	INTEGRATED CIRCUIT	SN74LS157N	
Z10	293536-1		INTEGRATED CIRCUIT	SN74LS74N	
Z11	293438-1	1	INTEGRATED CIRCUIT	SN74LS32N	
Z12	293545-1	1	INTEGRATED CIRCUIT	SN74LS02N	
Z13	293541-1	1	INTEGRATED CIRCUIT	SN74LS00N	
Z14	293540-1		INTEGRATED CIRCUIT	SN74LS04N	
Z15	293437-1	1	INTEGRATED CIRCUIT	SN74LS08N	
Z16	293540-1		INTEGRATED CIRCUIT	SN74LS04N	
Z17	293541-11	1	INTEGRATED CIRCUIT	SN74LS166N	
Z18	293541-9		INTEGRATED CIRCUIT	SN74LS161N	
Z19	293541-9		INTEGRATED CIRCUIT	SN74LS161N	
Z20	293541-9		INTEGRATED CIRCUIT	SN74LS161N	
Z21	293541-9		INTEGRATED CIRCUIT	SN74LS161N	
Z22	293541-9		INTEGRATED CIRCUIT	SN74LS161N	
Z23	293533-1	1	INTEGRATED CIRCUIT	SN74LS10N	
1A19	296216-1	1	DISPLAY TMG & HORIZ OUT PC BOARD ASSEMBLY	296216-1	7-41
C1	299240-2	1	CAPACITOR, 22µF	T368B226M015AS	
C2	299240-1	3	CAPACITOR, 6.8µF	T368B685M035AS	
C3	299240-1		CAPACITOR, 6.8µF	T368B685M035AS	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A19C4	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	7-41
C5	299250-821	1	CAPACITOR, 820ρF	CM06FD821J03	
C6	293294-2	21	CAPACITOR, 0.1μF	CY20C104P	
C7	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C8	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C9	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C10	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C11	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C12	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C13	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C14	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C15	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C16	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C17	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C18	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C19	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C20	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C21	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C22	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C23	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C24	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C25	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C26	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C27	299871-102	1	CAPACITOR, 1000ρF	CK05BX102K	
J1	294213-1	1	HEADER, RIGHT ANGLE	87230-5	
MP1	294968-2	1	EJECTOR, WHITE	5005-08N	
R1	299700-102	1	RESISTOR, 1K, 1/8W	RC05GF102J	
R2	299707-408	1	RESISTOR, 7.5K, 1/10W, ±1%	RN55C7501F	
R3	299707-390	2	RESISTOR, 4.99K, 1/10W, ±1%	RN55C4991F	
R4	299707-390		RESISTOR, 4.99K, 1/10W, ±1%	RN55C4991F	
R5	299707-251	1	RESISTOR, 221Ω, 1/10W, ±1%	RN55C2210F	
R6	299745-004	1	RESISTOR, VARIABLE, 100Ω	3009P-1-101	
R7	299745-010	1	RESISTOR, VARIABLE, 10K	3009P-1-103	
TP1	293310-1	5	TERMINAL	1597-2-01	
TP2	293310-1		TERMINAL	1597-2-01	
TP3	293310-1		TERMINAL	1597-2-01	
TP4	293310-1		TERMINAL	1597-2-01	
TP5	293310-1		TERMINAL	1597-2-01	
XZ1			NOT USED		
XZ2	294567-1	6	SOCKET, IC, 16 PIN	C931610	
XZ3	294573-1	10	SOCKET, IC, 14 PIN	C931410	
XZ4	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ5	294565-1	1	SOCKET, IC, 8 PIN	C930810	
XZ6	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ7	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ8	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ9	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ10	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ11	294595-1	1	SOCKET, IC, 20 PIN	C932010	
XZ12	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ13			NOT USED		
XZ14			NOT USED		
XZ15	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ16	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ17	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ18	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ19	294573-1		SOCKET, IC, 14 PIN	C931410	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A19XZ20	294573-1		SOCKET, IC, 14 PIN	C931410	7-41
XZ21	294573-1		SOCKET, IC, 14 PIN	C931410	
Z1			NOT USED		
Z2	293541-9	4	INTEGRATED CIRCUIT	SN74LS161N	
Z3	293536-1	3	INTEGRATED CIRCUIT	SN74LS74N-00	
Z4	294598-1	1	INTEGRATED CIRCUIT	MC3410CL	
Z5	294066-1	1	INTEGRATED CIRCUIT	LF356N	
Z6	293387-2	1	INTEGRATED CIRCUIT	IH5043CPE	
Z7	293540-1	2	INTEGRATED CIRCUIT	SN74LS04N-00	
Z8	293533-1	1	INTEGRATED CIRCUIT	SN74LS10N-00	
Z9	293437-1	1	INTEGRATED CIRCUIT	SN74LS08N	
Z10	293541-2	1	INTEGRATED CIRCUIT	SN74LS27N	
Z11	293541-17	1	INTEGRATED CIRCUIT	SN74LS273N	
Z12	293545-1	1	INTEGRATED CIRCUIT	SN74LS02N-00	
Z13			NOT USED		
Z14			NOT USED		
Z15	293544-1	1	INTEGRATED CIRCUIT	SN74LS20N-00	
Z16	293541-9		INTEGRATED CIRCUIT	SN74LS161N	
Z17	293541-9		INTEGRATED CIRCUIT	SN74LS161N	
Z18	293541-9		INTEGRATED CIRCUIT	SN74LS161N	
Z19	293536-1		INTEGRATED CIRCUIT	SN74LS74N-00	
Z20	293540-1		INTEGRATED CIRCUIT	SN74LS04N-00	
Z21	293536-1		INTEGRATED CIRCUIT	SN74LS74N-00	
1A20	296218-1	1	PUSHBUTTON INTFC AND LINE GEN PC BOARD ASSEMBLY	296218-1	7-42
C1	299240-002	3	CAPACITOR, 22μF	T368B226M015AS	
C2	299240-002		CAPACITOR, 22μF	T368B226M015AS	
C3	299240-002		CAPACITOR, 22μF	T368B226M015AS	
C4	299240-001	3	CAPACITOR, 6.8μF	T368B685M035AS	
C5	299240-001		CAPACITOR, 6.8μF	T368B685M035AS	
C6	299240-001		CAPACITOR, 6.8μF	T368B685M035AS	
C7	299250-101	1	CAPACITOR, 100pF	CM04FD101J03	
C8	299241-100	1	CAPACITOR, 10pF	DM5CC-100J	
C9	299250-471	1	CAPACITOR, 470pF	CM06FD471J03	
C10	293294-2	44	CAPACITOR, .1μF	CY20C104P	
C11	293294-2		CAPACITOR, .1μF	CY20C104P	
C12	293294-2		CAPACITOR, .1μF	CY20C104P	
C13	293294-2		CAPACITOR, .1μF	CY20C104P	
C14	293294-2		CAPACITOR, .1μF	CY20C104P	
C15	293294-2		CAPACITOR, .1μF	CY20C104P	
C16	293294-2		CAPACITOR, .1μF	CY20C104P	
C17	293294-2		CAPACITOR, .1μF	CY20C104P	
C18	293294-2		CAPACITOR, .1μF	CY20C104P	
C19	293294-2		CAPACITOR, .1μF	CY20C104P	
C20			NOT USED		
C21	293294-2		CAPACITOR, .1μF	CY20C104P	
C22	293294-2		CAPACITOR, .1μF	CY20C104P	
C23	293294-2		CAPACITOR, .1μF	CY20C104P	
C24	293294-2		CAPACITOR, .1μF	CY20C104P	
C25	293294-2		CAPACITOR, .1μF	CY20C104P	
C26	293294-2		CAPACITOR, .1μF	CY20C104P	
C27	293294-2		CAPACITOR, .1μF	CY20C104P	
C28	293294-2		CAPACITOR, .1μF	CY20C104P	
C29	293294-2		CAPACITOR, .1μF	CY20C104P	
C30	293294-2		CAPACITOR, .1μF	CY20C104P	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A20C31	293294-2		CAPACITOR, .1μF	CY20C104P	7-42
C32	293294-2		CAPACITOR, .1μF	CY20C104P	
C33	293294-2		CAPACITOR, .1μF	CY20C104P	
C34	293294-2		CAPACITOR, .1μF	CY20C104P	
C35	293294-2		CAPACITOR, .1μF	CY20C104P	
C36	293294-2		CAPACITOR, .1μF	CY20C104P	
C37	293294-2		CAPACITOR, .1μF	CY20C104P	
C38	293294-2		CAPACITOR, .1μF	CY20C104P	
C39	293294-2		CAPACITOR, .1μF	CY20C104P	
C40	293294-2		CAPACITOR, .1μF	CY20C104P	
C41	293294-2		CAPACITOR, .1μF	CY20C104P	
C42	293294-2		CAPACITOR, .1μF	CY20C104P	
C43	293294-2		CAPACITOR, .1μF	CY20C104P	
C44	293294-2		CAPACITOR, .1μF	CY20C104P	
C45	293294-2		CAPACITOR, .1μF	CY20C104P	
C46	293294-2		CAPACITOR, .1μF	CY20C104P	
C47	293294-2		CAPACITOR, .1μF	CY20C104P	
C48	293294-2		CAPACITOR, .1μF	CY20C104P	
C49	293294-2		CAPACITOR, .1μF	CY20C104P	
C50	293294-2		CAPACITOR, .1μF	CY20C104P	
C51	293294-2		CAPACITOR, .1μF	CY20C104P	
C52	293294-2		CAPACITOR, .1μF	CY20C104P	
C53	293294-2		CAPACITOR, .1μF	CY20C104P	
C54	293294-2		CAPACITOR, .1μF	CY20C104P	
CR1	293238	1	DIODE	1N825A	
CR2	293240	5	DIODE	1N914	
CR3	293240		DIODE	1N914	
CR4	293240		DIODE	1N914	
CR5	293240		DIODE	1N914	
CR6	293240		DIODE	1N914	
E1	293306	4	TERMINAL	1019-2-901	
E2	293306		TERMINAL	1019-2-901	
E3	293306		TERMINAL	1019-2-901	
E4	293306		TERMINAL	1019-2-901	
J1	294213-3	2	HEADER, RIGHT ANGLE, 20 PIN	1-87230-0	
J2	294213-3		HEADER, RIGHT ANGLE, 20 PIN	1-87230-0	
MP1	294968-2	2	EJECTOR, WHITE	5005-08N	
Q1	294157-1	1	TRANSISTOR	2N4401	
Q2	294157-2	1	TRANSISTOR	2N4264	
R1	299700-102	4	RESISTOR, 1K, 1/8W	RC05GF102J	
R2	299700-102		RESISTOR, 1K, 1/8W	RC05GF102J	
R3	299700-102		RESISTOR, 1K, 1/8W	RC05GF102J	
R4	299700-103	3	RESISTOR, 10K, 1/8W	RC05GF103J	
R5	299745-004	1	RESISTOR, VARIABLE, 100Ω	3009P-1-101	
R6	299700-103		RESISTOR, 10K, 1/8W	RC05GF103J	
R7	299700-103		RESISTOR, 10K, 1/8W	RC05GF103J	
R8	299700-222	1	RESISTOR, 2.2K, 1/8W	RC05GF222J	
R9	299700-301	1	RESISTOR, 300Ω, 1/8W	RC05GF301J	
R10	299700-332	5	RESISTOR, 3.3K, 1/8W	RC05GF332J	
R11	299700-332		RESISTOR, 3.3K, 1/8W	RC05GF332J	
R12	299700-332		RESISTOR, 3.3K, 1/8W	RC05GF332J	
R13	299700-332		RESISTOR, 3.3K, 1/8W	RC05GF332J	
R14	299700-511	3	RESISTOR, 510Ω, 1/8W	RC05GF511J	
R15	299700-511		RESISTOR, 510Ω, 1/8W	RC05GF511J	
R16	299700-511		RESISTOR, 510Ω, 1/8W	RC05GF511J	
R17	299700-104	1	RESISTOR, 100K, 1/8W	RC05GF104J	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A20R18	299707-321	1	RESISTOR, 1K, 1/10W, 1%	RN55C1001F	7-42
R19	299707-420	4	RESISTOR, 10K, 1/10W, 1%	RN55C1002F	
R20	299707-420		RESISTOR, 10K, 1/10W, 1%	RN55C1002F	
R21	299707-420		RESISTOR, 10K, 1/10W, 1%	RN55C1002F	
R22	299707-420		RESISTOR, 10K, 1/10W, 1%	RN55C1002F	
R23	299707-329	1	RESISTOR, 1.21K, 1/10W, 1%	RN55C1211F	
R24	299707-350	3	RESISTOR, 2K, 1/10W, 1%	RN55C2001F	
R25	299707-350		RESISTOR, 2K, 1/10W, 1%	RN55C2001F	
R26	299707-350		RESISTOR, 2K, 1/10W, 1%	RN55C2001F	
R27	299707-371	3	RESISTOR, 3.32K, 1/10W, 1%	RN55C3321F	
R28	299707-371		RESISTOR, 3.32K, 1/10W, 1%	RN55C3321F	
R29	299708-432	1	RESISTOR, 13K, 1/10W, 1%	RN55C1302F	
R30	299709-261	1	RESISTOR, 274Ω, 1/8W, 1%	RN60C2740F	
R31	299707-388	1	RESISTOR, 4.75K, 1/10W, 1%	RN55C4751F	
R32	299707-390	4	RESISTOR, 4.99K, 1/10W, 1%	RN55C4991F	
R33	299707-390		RESISTOR, 4.99K, 1/10W, 1%	RN55C4991F	
R34	299707-390		RESISTOR, 4.99K, 1/10W, 1%	RN55C4991F	
R35	299707-390		RESISTOR, 4.99K, 1/10W, 1%	RN55C4991F	
R36	299707-395	1	RESISTOR, 5.49K, 1/10W, 1%	RN55C5491F	
R37	299707-371		RESISTOR, 3.32K, 1/10W, 1%	RN55C3321F	
R38	299745-007	1	RESISTOR, VARIABLE, 1K	3009P-1-102	
R39	299745-010	4	RESISTOR, VARIABLE, 10K	3009P-1-103	
R40	299745-010		RESISTOR, VARIABLE, 10K	3009P-1-103	
R41	299745-010		RESISTOR, VARIABLE, 10K	3009P-1-103	
R42	299745-010		RESISTOR, VARIABLE, 10K	3009P-1-103	
R43	299745-006	1	RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R44	299700-332		RESISTOR, 3.3K, 1/8W	RC05GF332J	
R45	299700-102		RESISTOR, 1K, 1/8W	RC05GF102J	
S1	293646-1	1	SWITCH, DPST	CTS206-211	
TP1	293310-1	8	TERMINAL	1597-2-01	
TP2	293310-1		TERMINAL	1597-2-01	
TP3	293310-1		TERMINAL	1597-2-01	
TP4	293310-1		TERMINAL	1597-2-01	
TP5	293310-1		TERMINAL	1597-2-01	
TP6	293310-1		TERMINAL	1597-2-01	
TP7	293310-1		TERMINAL	1597-2-01	
TP8	293310-1		TERMINAL	1597-2-01	
XZ1	294567-1	14	SOCKET, IC, 16 PIN	C931610	
XZ2	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ3	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ4	294573-1	32	SOCKET, IC, 14 PIN	C931410	
XZ5	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ6	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ7	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ8	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ9	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ10	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ11	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ12	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ13	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ14	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ15	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ16	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ17	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ18	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ19	294573-1		SOCKET, IC, 14 PIN	C931410	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A20XZ20	294565-1	1	SOCKET, IC, 8 PIN	C930810	7-42
XZ21	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ22	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ23	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ24	294595-001	3	SOCKET, IC, 20 PIN	C932010	
XZ25	294595-001		SOCKET, IC, 20 PIN	C932010	
XZ26	294595-001		SOCKET, IC, 20 PIN	C932010	
XZ27	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ28	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ29	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ30	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ31	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ32	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ33	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ34	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ35	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ36	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ37	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ38	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ39	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ40	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ41	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ42			NOT USED		
XZ43			NOT USED		
XZ44	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ45	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ46	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ47	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ48	294573-1		SOCKET, IC, 14 PIN	C931410	
XX49	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ50	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ51	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ52	294573-1		SOCKET, IC, 14 PIN	C931410	
Z1	294598-1	2	INTEGRATED CIRCUIT	MC3410CL	
Z2	293541-18	3	INTEGRATED CIRCUIT	SN74LS283N	
Z3	293541-18		INTEGRATED CIRCUIT	SN74LS283N	
Z4	293541-12	1	INTEGRATED CIRCUIT	SN74LS01N	
Z5	293590-1	1	INTEGRATED CIRCUIT	SN74LS112N	
Z6	293545-1	6	INTEGRATED CIRCUIT	SN74LS02N	
Z7	293446-1	2	INTEGRATED CIRCUIT	SN7416N	
Z8	293545-1		INTEGRATED CIRCUIT	SN74LS02N	
Z9	293541-20	3	INTEGRATED CIRCUIT	SN74LS51N	
Z10	293541-20		INTEGRATED CIRCUIT	SN74LS51N	
Z11	293541-14	1	INTEGRATED CIRCUIT	SN74LS86N	
Z12	293438-1	3	INTEGRATED CIRCUIT	SN74LS32N	
Z13	293536-1	6	INTEGRATED CIRCUIT	SN74LS74N	
Z14	293545-1		INTEGRATED CIRCUIT	SN74LS02N	
Z15	293536-1		INTEGRATED CIRCUIT	SN74LS74N	
Z16	293438-1		INTEGRATED CIRCUIT	SN74LS32N	
Z17	293529-1	2	INTEGRATED CIRCUIT	SN74LS279N	
Z18	293387-2	2	INTEGRATED CIRCUIT	IH5043CPE	
Z19	294480-1	2	INTEGRATED CIRCUIT	TL074CN	
Z20	294066-1	1	INTEGRATED CIRCUIT	LF356	
Z21	294598-1		INTEGRATED CIRCUIT	MC3410CL	
Z22	293541-21	3	INTEGRATED CIRCUIT	SN74LS175N	
Z23	293541-21		INTEGRATED CIRCUIT	SN74LS175N	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A20Z24	293541-17	1	INTEGRATED CIRCUIT	SN74LS273N	7-42
Z25	293541-7	1	INTEGRATED CIRCUIT	SN74LS244N	
Z26	294596-1	1	INTEGRATED CIRCUIT	SN74S471N	
Z27	293540-1	2	INTEGRATED CIRCUIT	SN74LS04N	
Z28	293438-1		INTEGRATED CIRCUIT	SN74LS32N	
Z29	293545-1		INTEGRATED CIRCUIT	SN74LS02N	
Z30	293541-20		INTEGRATED CIRCUIT	SN74LS51N	
Z31	293536-1		INTEGRATED CIRCUIT	SN74LS74N	
Z32	293536-1		INTEGRATED CIRCUIT	SN74LS74N	
Z33	293536-1		INTEGRATED CIRCUIT	SN74LS74N	
Z34	292545-1		INTEGRATED CIRCUIT	SN74LS02N	
Z35	293540-1		INTEGRATED CIRCUIT	SN74LS04N	
Z36	293529-1		INTEGRATED CIRCUIT	SN74LS279N	
Z37	293691-6	1	RESISTOR PAK	316A103	
Z38	294480-1		INTEGRATED CIRCUIT	TL074CN	
Z39	293387-2		INTEGRATED CIRCUIT	1H5043CPE	
Z40	293541-18		INTEGRATED CIRCUIT	SN74LS283N	
Z41	293541-21		INTEGRATED CIRCUIT	SN74LS175N	
Z42	293631-1	1	INTEGRATED CIRCUIT	LM320T-15	
Z43	293632-1	1	INTEGRATED CIRCUIT	LM340T-15	
Z44	293541-1	3	INTEGRATED CIRCUIT	SN74LS00N	
Z45	293544-1	1	INTEGRATED CIRCUIT	SN74LS20N	
Z46	293541-1		INTEGRATED CIRCUIT	SN74LS00N	
Z47	293541-22	1	INTEGRATED CIRCUIT	SN74LS11N	
Z48	293539-1	1	INTEGRATED CIRCUIT	SN74LS08	
Z49	293545-1		INTEGRATED CIRCUIT	SN74LS02N	
Z50	293536-1		INTEGRATED CIRCUIT	SN74LS74N	
Z51	293541-1		INTEGRATED CIRCUIT	SN74LS00N	
Z52	293446-1		INTEGRATED CIRCUIT	SN7416N	
1A21	296220-1	1	DATA DIGITIZER AND MEMORY LOGIC CARD #6	296220-1	7-43
C1	299240-2	2	CAPACITOR, 22μF	T368B226M015AS	
C2	299240-1	3	CAPACITOR, 6.8μF	T368B685M035AS	
C3	299250-101	1	CAPACITOR, 100pF	CM04FD101J03	
C4	299250-102	3	CAPACITOR, 1000pF	CM06FD102J03	
C5	299250-102		CAPACITOR, 1000pF	CM06FD102J03	
C6	299250-102		CAPACITOR, 1000pF	CM06FD102J03	
C7	299250-222	2	CAPACITOR, 2200pF	CM06FD222J03	
C8	299250-222		CAPACITOR, 2200pF	CM06FD222J03	
C9	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C10	299240-1		CAPACITOR, 6.8μF	T368B685M035AS	
C11	293294-2	49	CAPACITOR, 0.1μF	CY20C104P	
C12	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C13	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C14	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C15	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C16	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C17	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C18	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C19	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C20	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C21	292294-2		CAPACITOR, 0.1μF	CY20C104P	
C22	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C23	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C24	293294-2		CAPACITOR, 0.1μF	CY20C104P	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A21C25	293294-2		CAPACITOR, 0.1μF	CY20C104P	7-43
C26	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C27	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C28	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C29	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C30	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C31	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C32	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C33	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C34	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C35	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C36	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C37	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C38	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C39	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C40	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C41	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C42	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C43	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C44	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C45	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C46	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C47	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C48	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C49	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C50	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C51	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C52	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C53	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C54	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C55	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C56	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C57	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C58	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C59	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C60	299240-2		CAPACITOR, 22μF	T368B226M015AS	
C61	299241-120	1	CAPACITOR, 12pF	DM5CC-120J	
CR1			NOT USED		
CR2	293240-1	3	DIODE	1N914	
CR3	293240-1		DIODE	1N914	
CR4	293240-1		DIODE	1N914	
J1	299933-1	1	HEADER, RIGHT ANGLE, 26 PIN	1-87230-3	
L1	296474	1	INDUCTOR, 5μH	6550-3	
MP1	294968-2	2	EJECTOR, WHITE	5005-08N	
MP2	294968-2		EJECTOR, WHITE	5005-08N	
Q1	294157-1	2	TRANSISTOR	2N4401	
Q2	294157-1		TRANSISTOR	2N4401	
R1	299700-102	4	RESISTOR, 1K, 1/8W, 5%	RC05GF102J	
R2	299700-102		RESISTOR, 1K, 1/8W, 5%	RC05GF102J	
R3	299700-102		RESISTOR, 1K, 1/8W, 5%	RC05GF102J	
R4	299700-102		RESISTOR, 1K, 1/8W, 5%	RC05GF102J	
R5	299700-103	2	RESISTOR, 10K, 1/8W, 5%	RC05GF103J	
R6	299700-103		RESISTOR, 10K, 1/8W, 5%	RC05GF103J	
R7	299700-222	2	RESISTOR, 2.2K, 1/8W, 5%	RC05GF222J	
R8	299700-222		RESISTOR, 2.2K, 1/8W, 5%	RC05GF222J	
R9			NOT USED		
R10	299700-332	1	RESISTOR, 3.3K, 1/8W, 5%	RC05GF332J	
R11			NOT USED		
R12	299707-321	5	RESISTOR, 1K, 1/10W, 1%	RN55C1001F	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A21R13	299707-321		RESISTOR, 1K, 1/10W, 1%	RN55C1001F	7-43
R14	299707-321		RESISTOR, 1K, 1/10W, 1%	RN55C1001F	
R15	299707-321		RESISTOR, 1K, 1/10W, 1%	RN55C1001F	
R16	299707-321		RESISTOR, 1K, 1/10W, 1%	RN55C1001F	
R17	299708-403	1	RESISTOR, 6.49K, 1/10W, 1%	RN55D6491F	
R18	299707-420	5	RESISTOR, 10K, 1/10W, 1%	RN55C1002F	
R19	299707-420		RESISTOR, 10K, 1/10W, 1%	RN55C1002F	
R20	299707-420		RESISTOR, 10K, 1/10W, 1%	RN55C1002F	
R21	299707-420		RESISTOR, 10K, 1/10W, 1%	RN55C1002F	
R22	299707-420		RESISTOR, 10K, 1/10W, 1%	RN55C1002F	
R23	299707-359	1	RESISTOR, 2.49K, 1/10W, 1%	RN55C2491F	
R24	299707-371	1	RESISTOR, 3.32K, 1/10W, 1%	RN55C3321F	
R25	299707-390	4	RESISTOR, 4.99K, 1/10W, 1%	RN55C4991F	
R26	299707-390		RESISTOR, 4.99K, 1/10W, 1%	RN55C4991F	
R27	299707-390		RESISTOR, 4.99K, 1/10W, 1%	RN55C4991F	
R28	299707-390		RESISTOR, 4.99K, 1/10W, 1%	RN55C4991F	
R29	299707-408	1	RESISTOR, 7.5K, 1/10W, 1%	RN55C7501F	
R30	299745-8	1	RESISTOR, VARIABLE, 2K	3009P-1-202	
R31	299745-13	3	RESISTOR, VARIABLE, 50K	3009P-1-503	
R32	299745-13		RESISTOR, VARIABLE, 50K	3009P-1-503	
R33	299745-13		RESISTOR, VARIABLE, 50K	3009P-1-503	
R34	299701-151	1	RESISTOR, 150Ω, 1/4W	RC07GF151J	
TP1	293310-1	2	TERMINAL	1597-2-01	
TP2	293310-1		TERMINAL	1597-2-01	
XZ1	294573-1	27	SOCKET, IC, 14 PIN	C931410	
XZ2	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ3	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ4	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ5	294574-1	10	SOCKET, IC, 18 PIN	C931810	
XZ6	294574-1		SOCKET, IC, 18 PIN	C931810	
XZ7	294574-1		SOCKET, IC, 18 PIN	C931810	
XZ8	294574-1		SOCKET, IC, 18 PIN	C931810	
XZ9	294574-1		SOCKET, IC, 18 PIN	C931810	
XZ10	294574-1		SOCKET, IC, 18 PIN	C931810	
XZ11	294574-1		SOCKET, IC, 18 PIN	C931810	
XZ12	294574-1		SOCKET, IC, 18 PIN	C931810	
XZ13	294574-1		SOCKET, IC, 18 PIN	C931810	
XZ14	294574-1		SOCKET, IC, 18 PIN	C931810	
XZ15	294595-1	7	SOCKET, IC, 20 PIN	C932010	
XZ16	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ17	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ18	294567-1	12	SOCKET, IC, 16 PIN	C931610	
XZ19	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ20	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ21	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ22	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ23	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ24	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ25	294565-1	2	SOCKET, IC, 8 PIN	C930810	
XZ26	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ27	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ28	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ29	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ30	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ31	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ32	294567-1		SOCKET, IC, 16 PIN	C931610	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A21 XZ33	294573-1		SOCKET, IC, 14 PIN	C931410	7-43
XZ34	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ35	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ36	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ37	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ38	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ39	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ40	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ41	294566-1	2	SOCKET, IC, 24 PIN	C932410	
XZ42	294566-1		SOCKET, IC, 24 PIN	C932410	
XZ43	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ44	294565-1		SOCKET, IC, 8 PIN	C930810	
XZ45	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ46	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ47	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ48	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ49	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ50	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ51	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ52	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ53	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ54	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ55	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ56	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ57	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ58	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ59	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ60	294567-1		SOCKET, IC, 16 PIN	C931610	
Z1	293446-1	4	INTEGRATED CIRCUIT	SN7416N	
Z2	293446-1		INTEGRATED CIRCUIT	SN7416N	
Z3	293446-1		INTEGRATED CIRCUIT	SN7416N	
Z4	293446-1		INTEGRATED CIRCUIT	SN7416N	
Z5	294599-1	10	INTEGRATED CIRCUIT	P2141-5	
Z6	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z7	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z8	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z9	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z10	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z11	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z12	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z13	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z14	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z15	293541-7	4	INTEGRATED CIRCUIT	SN74LS244N	
Z16	293541-7		INTEGRATED CIRCUIT	SN74LS244N	
Z17	293541-19	1	INTEGRATED CIRCUIT	SN74LS374N	
Z18	293541-16	3	INTEGRATED CIRCUIT	SN74LS193N	
Z19	293541-16		INTEGRATED CIRCUIT	SN74LS193N	
Z20	293541-16		INTEGRATED CIRCUIT	SN74LS193N	
Z21	293536-1	7	INTEGRATED CIRCUIT	SN74LS74N-00	
Z22	293541-17	2	INTEGRATED CIRCUIT	SN74LS273N	
Z23	293536-1		INTEGRATED CIRCUIT	SN74LS74N-00	
Z24	294598-1	2	INTEGRATED CIRCUIT	MC3410CL	
Z25	294498-3	2	INTEGRATED CIRCUIT	LM311N	
Z26	293540	3	INTEGRATED CIRCUIT	SN74LS04N-00	
Z27	293541-17		INTEGRATED CIRCUIT	SN74LS273N	
Z28	293541-18	3	INTEGRATED CIRCUIT	SN74LS283N	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Fi
1A21Z29	293540		INTEGRATED CIRCUIT	SN74LS04N-00	7
Z30	293541-18		INTEGRATED CIRCUIT	SN74LS283N	
Z31	293536-1		INTEGRATED CIRCUIT	SN74LS74N-00	
Z32	293541-9	1	INTEGRATED CIRCUIT	SN74LS161N	
Z33	293536-1		INTEGRATED CIRCUIT	SN74LS74N-00	
Z34	293541-5	1	INTEGRATED CIRCUIT	SN74LS139N	
Z35	293540		INTEGRATED CIRCUIT	SN74LS04N-00	
Z36	293541-13	1	INTEGRATED CIRCUIT	SN74LS54N	
Z37	293541-1	4	INTEGRATED CIRCUIT	SN74LS00N	
Z38	293545-1	3	INTEGRATED CIRCUIT	SN74LS02N-00	
Z39	293437-1	1	INTEGRATED CIRCUIT	SN74LS08N	
Z40	293536-1		INTEGRATED CIRCUIT	SN74LS74N-00	
Z41	294597-1	2	INTEGRATED CIRCUIT	AM25L04PC	
Z42	294597-1		INTEGRATED CIRCUIT	AM25L04PC	
Z43	294598-1		INTEGRATED CIRCUIT	MC3410CL	
Z44	294498-3		INTEGRATED CIRCUIT	LM311N	
Z45	294480-1	2	INTEGRATED CIRCUIT	TL074CN	
Z46	293541-18		INTEGRATED CIRCUIT	SN74LS283N	
Z47	293541-7		INTEGRATED CIRCUIT	SN74LS244N	
Z48	293541-7		INTEGRATED CIRCUIT	SN74LS244N	
Z49	293541-4	1	INTEGRATED CIRCUIT	SN74LS125N	
Z50	293541-1		INTEGRATED CIRCUIT	SN74LS00N	
Z51	293545-1		INTEGRATED CIRCUIT	SN74LS02N-00	
Z52	293541-1		INTEGRATED CIRCUIT	SN74LS00N	
Z53	293536-1		INTEGRATED CIRCUIT	SN74LS74N-00	
Z54	293541-14	1	INTEGRATED CIRCUIT	SN74LS86N	
Z55	293541-1		INTEGRATED CIRCUIT	SN74LS00N	
Z56	293545-1		INTEGRATED CIRCUIT	SN74LS02N-00	
Z57	293536-1		INTEGRATED CIRCUIT	SN74LS74N-00	
Z58	293541-15	1	INTEGRATED CIRCUIT	SN74LS123N	
Z59	294480-1		INTEGRATED CIRCUIT	TL074CN	
Z60	294066-2	1	INTEGRATED CIRCUIT	LF13201N	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A21XZ33	294573-1		SOCKET, IC, 14 PIN	C931410	7-43
XZ34	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ35	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ36	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ37	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ38	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ39	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ40	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ41	294566-1	2	SOCKET, IC, 24 PIN	C932410	
XZ42	294566-1		SOCKET, IC, 24 PIN	C932410	
XZ43	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ44	294565-1		SOCKET, IC, 8 PIN	C930810	
XZ45	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ46	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ47	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ48	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ49	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ50	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ51	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ52	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ53	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ54	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ55	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ56	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ57	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ58	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ59	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ60	294567-1		SOCKET, IC, 16 PIN	C931610	
Z1	293446-1	4	INTEGRATED CIRCUIT	SN7416N	
Z2	293446-1		INTEGRATED CIRCUIT	SN7416N	
Z3	293446-1		INTEGRATED CIRCUIT	SN7416N	
Z4	293446-1		INTEGRATED CIRCUIT	SN7416N	
Z5	294599-1	10	INTEGRATED CIRCUIT	P2141-5	
Z6	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z7	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z8	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z9	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z10	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z11	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z12	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z13	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z14	294599-1		INTEGRATED CIRCUIT	P2141-5	
Z15	293541-7	4	INTEGRATED CIRCUIT	SN74LS244N	
Z16	293541-7		INTEGRATED CIRCUIT	SN74LS244N	
Z17	293541-19	1	INTEGRATED CIRCUIT	SN74LS374N	
Z18	293541-16	3	INTEGRATED CIRCUIT	SN74LS193N	
Z19	293541-16		INTEGRATED CIRCUIT	SN74LS193N	
Z20	293541-16		INTEGRATED CIRCUIT	SN74LS193N	
Z21	293536-1	7	INTEGRATED CIRCUIT	SN74LS74N-00	
Z22	293541-17	2	INTEGRATED CIRCUIT	SN74LS273N	
Z23	293536-1		INTEGRATED CIRCUIT	SN74LS74N-00	
Z24	294598-1	2	INTEGRATED CIRCUIT	MC3410CL	
Z25	294498-3	2	INTEGRATED CIRCUIT	LM311N	
Z26	293540	3	INTEGRATED CIRCUIT	SN74LS04N-00	
Z27	293541-17		INTEGRATED CIRCUIT	SN74LS273N	
Z28	293541-18	3	INTEGRATED CIRCUIT	SN74LS283N	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A21Z29	293540		INTEGRATED CIRCUIT	SN74LS04N-00	7-43
Z30	293541-18		INTEGRATED CIRCUIT	SN74LS283N	
Z31	293536-1		INTEGRATED CIRCUIT	SN74LS74N-00	
Z32	293541-9	1	INTEGRATED CIRCUIT	SN74LS161N	
Z33	293536-1		INTEGRATED CIRCUIT	SN74LS74N-00	
Z34	293541-5	1	INTEGRATED CIRCUIT	SN74LS139N	
Z35	293540		INTEGRATED CIRCUIT	SN74LS04N-00	
Z36	293541-13	1	INTEGRATED CIRCUIT	SN74LS54N	
Z37	293541-1	4	INTEGRATED CIRCUIT	SN74LS00N	
Z38	293545-1	3	INTEGRATED CIRCUIT	SN74LS02N-00	
Z39	293437-1	1	INTEGRATED CIRCUIT	SN74LS08N	
Z40	293536-1		INTEGRATED CIRCUIT	SN74LS74N-00	
Z41	294597-1	2	INTEGRATED CIRCUIT	AM25L04PC	
Z42	294597-1		INTEGRATED CIRCUIT	AM25L04PC	
Z43	294598-1		INTEGRATED CIRCUIT	MC3410CL	
Z44	294498-3		INTEGRATED CIRCUIT	LM311N	
Z45	294480-1	2	INTEGRATED CIRCUIT	TL074CN	
Z46	293541-18		INTEGRATED CIRCUIT	SN74LS283N	
Z47	293541-7		INTEGRATED CIRCUIT	SN74LS244N	
Z48	293541-7		INTEGRATED CIRCUIT	SN74LS244N	
Z49	293541-4	1	INTEGRATED CIRCUIT	SN74LS125N	
Z50	293541-1		INTEGRATED CIRCUIT	SN74LS00N	
Z51	293545-1		INTEGRATED CIRCUIT	SN74LS02N-00	
Z52	293541-1		INTEGRATED CIRCUIT	SN74LS00N	
Z53	293536-1		INTEGRATED CIRCUIT	SN74LS74N-00	
Z54	293541-14	1	INTEGRATED CIRCUIT	SN74LS86N	
Z55	293541-1		INTEGRATED CIRCUIT	SN74LS00N	
Z56	293545-1		INTEGRATED CIRCUIT	SN74LS02N-00	
Z57	293536-1		INTEGRATED CIRCUIT	SN74LS74N-00	
Z58	293541-15	1	INTEGRATED CIRCUIT	SN74LS123N	
Z59	294480-1		INTEGRATED CIRCUIT	TL074CN	
Z60	294066-2	1	INTEGRATED CIRCUIT	LF13201N	

Table 8-3. Recommended Spare Parts List

Name	Part Number
Service Kit	296423-1
RF Amplifier	230625
IF Attenuator	295858-2
Log IF Amplifier	296123-1
Yig Driver Board	299395-4
RF Coaxial Switch	231079
Mixer Microwave	230567-2
2060 MHz Oscillator	230817
Mixer Harmonic	230478
Tuner Assembly	299137-2
Yig Oscillator	295933-1
Yig Filter	299463-2
RF Attenuator	295835-1
RF Cable (Input)	296124-1
RF Cable (Deck)	298505-113
Absolute Power Board Assembly	295852-2
Sweep Generator PC Board	296200-1
Processed Video PC Board	296202-1
Regulator Bias PC Board	296204-1
Digital Display 1, PC Board	296208-1
Digital Display 2, PC Board	296206-1
Frequency/Power Reference PC Board	296210-1
Character Generator PC Board	296496-2
Horizontal Timing PC Board	296214-1
Display Timing PC Board	296216-1
Pushbutton Interface/Line Generator PC Board	296218-1
Data Digitizer and Memory PC Board	296220-1

APPENDIX A

100/300 HZ FILTER OPTION

A-1. SYSTEM OPERATION

A-2. DESCRIPTION

This 100/300 Hz Filter Option is offered in order to enhance the IF Bandwidth selectivity of the 757 Spectrum Analyzer.

This option is a functional part of the IF processor assembly 1A10A1, with the input of the option being derived from the first IF filter board 1A10A1A3 and it's output being fed to the processor PC board 1A10A1A1, see Figure A-1.

The option affects the following standard assemblies,

1A2A4	IF Bandwidth Switch
1A3	Rear Panel
1A10A1	IF Processor
1A10A6	Local Oscillator
1A17	Character Generator and Data Encoder and provides two new major assemblies
1A22A1	100/300 Hz Filter PC Board
1A22A2	Amplifier PC Board.

The front panel IF Bandwidth Switch Assembly 1A2A4 is modified from a 5 position to a 6 position to provide a 0.1/0.3 KHz mode, see Figure A-2.

Rear Panel Assembly connector 1A3J15 pins 43 and 44 is modified to provide the data output of the filter option from the Character Generator PC Board 1A17.

One amplifier was removed from Processor PC Board 1A10A1A1 for this option, see Figure A-3.

Local Oscillator Assembly 1A10A6 is selected for residual FM of less than or equal to 100 Hz.

Character Generator and Data Encoder PC Board 1A17 (Figure A-4) PROM is changed in order to provide a CRT character readout for the option's selected IF bandwidth.

A-3. OPERATION

When an IF bandwidth - other than 100/300 Hz is selected, the filter bypass circuitry of the option is enabled, as explained analytically in the operation of the unit's circuit. When the desired bandwidth is 100/300 Hz, then the option mode is energized to provide this condition. A functional block diagram is shown in Figure A-1, and typical signal levels are designated.

A-4. SPECIFICATIONS

The following specifications describe the 757-100/300 option.

a. 0.1/0.3 KHz IF bandwidth position is added to the IF BANDWIDTH (KHz) control function and must be manually selected.

b. UNCAL LED is enabled when 0.1/0.3 KHz bandwidth is selected.

c. CRT character readout for IF bandwidth indicates 0.1/0.3 KHz when selected.

d. Rear panel data output connector A3J15 includes one additional parallel coded line to indicate 0.1/0.3 KHz bandwidth position.

e. System noise enhancement will be 10 db/5 db for 300 Hz close to carrier. No enhancement for noise at system sensitivity below that which is defined by 1 KHz bandwidth. (This is due to non available system gain, necessary for system front end noise to override log IF noise.)

f. Residual FM less than or equal to 100 Hz

g. Bandwidth 100 Hz ± 30 Hz (300 Hz ± 50 Hz)

h. Shape factor (30 db to 3 db ratio) ⩽ 8:1

i. Gain variation between 100/300 Hz and other IF filters ± 1 db maximum.

A-5. PERFORMANCE TEST

In this paragraph alignment of the option with the entire system is presented.

1. Connect 757-100/757-300 option into the system.

2. Set the front panel controls as follows:

POWER ON/OFF	ON
RF RANGE (GHz)	1.8 – 4.0
IF ATTEN (dB)	0
RF ATTEN (dB)	10
SCAN MODE	AUTO
SCAN WIDTH/DIV	1 KHZ
SCAN TIME/DIV	10 MSEC
IF BANDWIDTH (KHz)	1
VERT SCALE/DIV	10
CALIBRATE	On
CENTER FREQUENCY (MHZ)	3000
BYPASS	Off
SIGNAL IN	On
READOUT DISABLE	On
A	On

3. Adjust TUNING control so that the signal is centered on the CRT.

4. Adjust 21.4 MHz TUNE capacitor A22A2C11 (Figure A-5) for maximum output on the display.

5. Press HOLD pushbutton.

6. Turn IF BANDWIDTH (KHz) switch to 0.1/0.3 KHz position and verify character readout of such change on the display.

7. Press B VIEW A pushbutton.

8. Adjust FILTER CTR capacitor A22A1C9 such that the 100/300 Hz filter envelope is centered properly within the 1 KHz filter envelope on display.

9. Adjust FILTER GAIN potentiometer A22-A2R6 such that the peak amplitude of the 100/300 Hz filter envelope is equal to that of the 1 KHz filter within 1 dB. (Note: It may be necessary to change the amplitude scale to 2 dB/div in order to achieve better resolution for this step.)

10. Repeat steps 4 through 9 to verify correct alignment.

A-6. 100/300 HZ FILTER OPTION ASSEMBLY 1A22

A-7. DESCRIPTION

The option consists of two major assemblies:

a. Filter Assembly 100/300 Hz 1A22A1

b. Amplifier Assembly 1A22A2

The filter assembly of the option includes the:

a. Local oscillator

b. Down converter

c. 100 Hz (300 Hz) BPF

d. Amplifier

e. Up converter

While the amplifier assembly consists of:

a. Amplifier

b. 10 kHz BPF

c. 25 dB gain amplifier.

In order to visually realize the above, refer to the functional block diagram of the option Figure A-1.

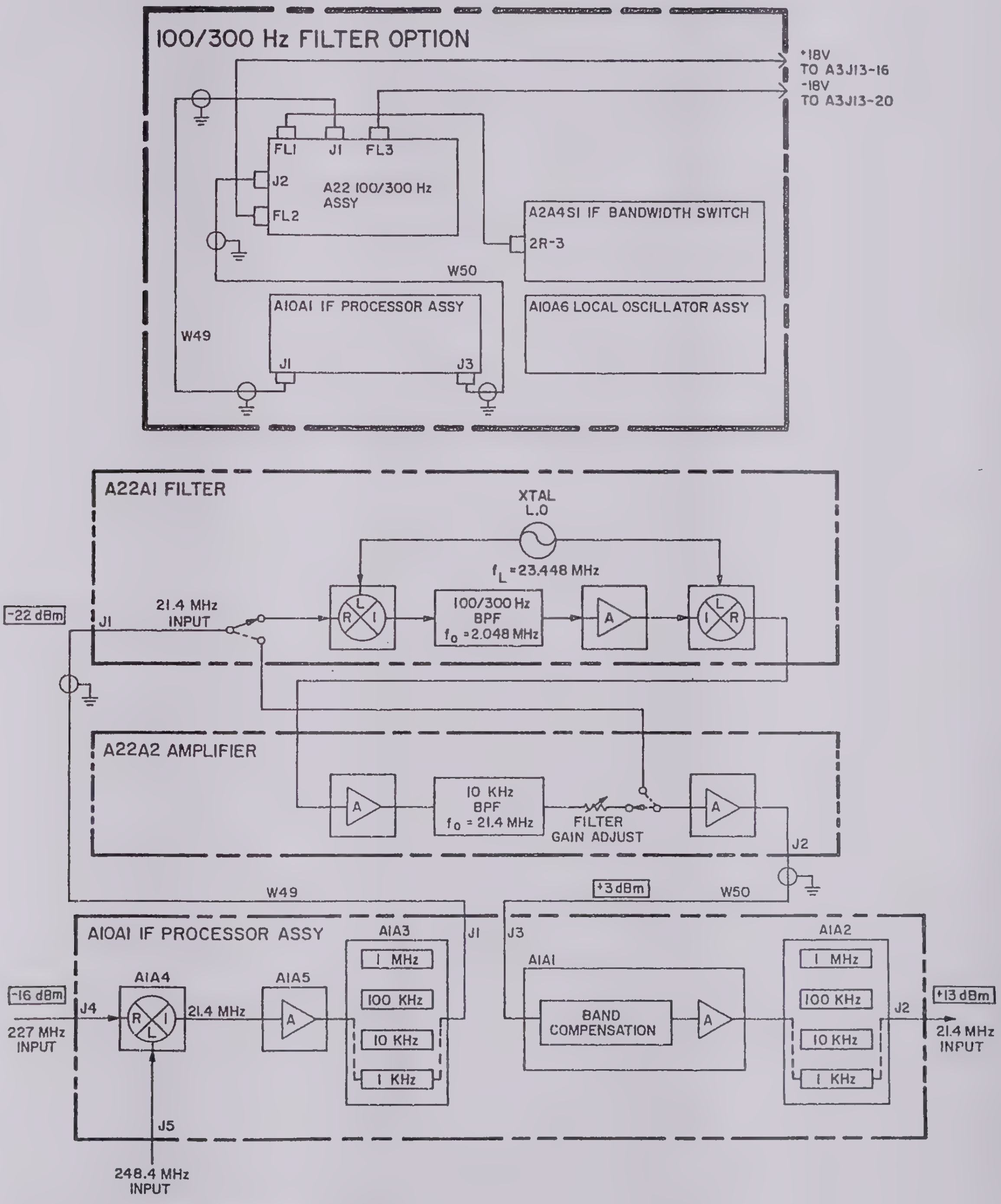
A-8. OPERATION

The 100/300 option has two modes of operation; the filter bypass and the 100/300 Hz filter. When the selected system IF bandwidth is other than 100/300 Hz, the filter bypass mode is enabled. If the desired bandwidth is 100/300 Hz then the filter mode is energized. This switching action (Figure A-6) is done by connecting +18Vdc to FL1 FILTER SELECT. With no input voltage to FL1, a negative voltage appears on FL1, which turns on A22A1Q1. This condition switches a positive voltage which forward biases A22A1CR2 and A22A2CR3. With A22A1CR2 turned on the 21.4 MHz INPUT signal at A22J1 flows through to the amplifier section.

The 100/300 Hz bandwidth is selected by applying a positive voltage (+18 Vdc) to FL1. Under this condition, A1Q1 is turned off and, therefore, A1CR2 and A2CR3 are turned off in the reverse bias state. At the same time, A1CR1, A1CR3, A2CR1 and A2CR2 are turned on. A1CR1 allows the 21.4 MHz signal to reach Mixer 1. A1CR3 and A2CR1 provide dc bias to A1Q2, A1Q3 and A2Q1, respectively to turn on the oscillator and amplifier. Also, A2CR2 allows the RF signal to reach the gain amplifier A2Q2.

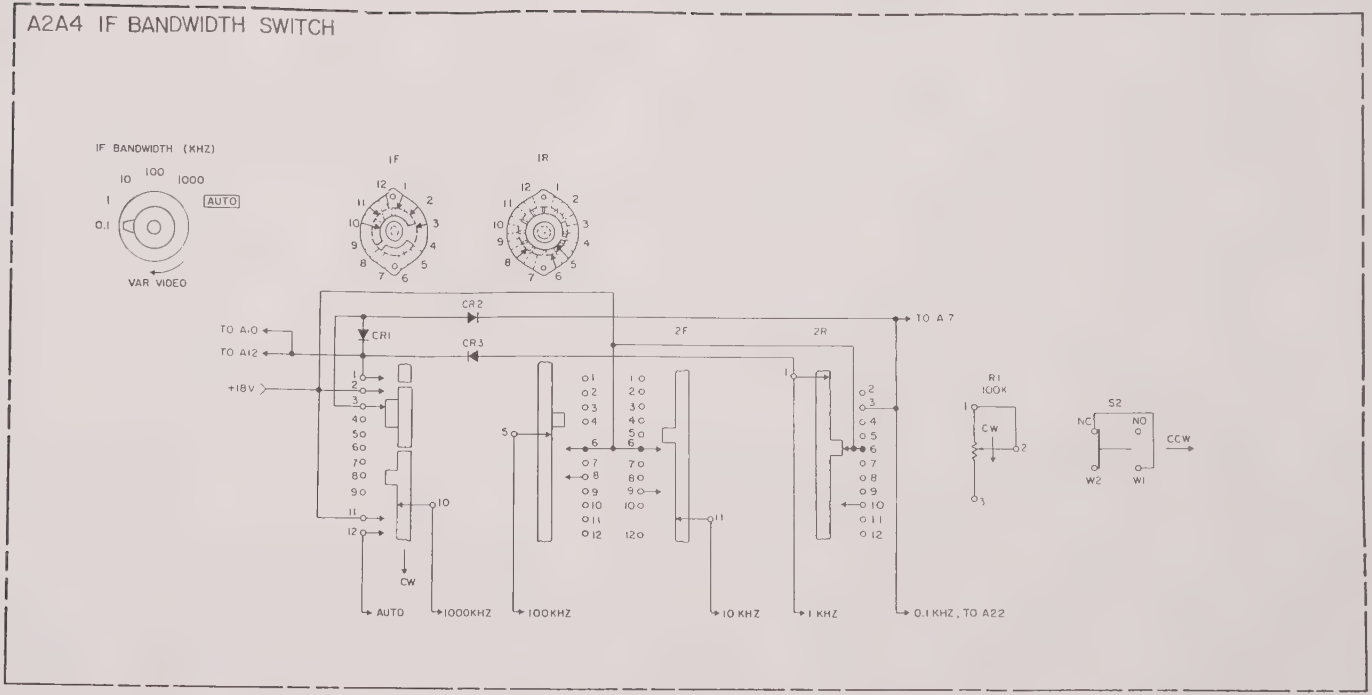
The local oscillator operates at 23.448 MHz and provides a level of +7 dBm nominal at the L port of Mixer 1 and Mixer 2. After the signal is down converted to 2.048 MHz by Mixer 1 - it passes through filter A1XFL1. The filter has a center frequency of 2.048 MHz and bandwidth of 100 Hz. (300 Hz for 300 option). After the filter the signal is amplified by A1Q3, and then up converted to 21.4 MHz.

Sequentially, this signal will be routed through amplifier A2Q1, and then it will pass through filter A2XFL1. This filter has a center frequency of 21.4 MHz and a bandwidth of 10 kHz. The purpose of this filter is to reduce the LO contamination at the output of the option. After passing through the filter the signal is then transferred to the gain amplifier A2Q2 and then, transformer coupled to the 21.4 MHz OUTPUT connector A22J2.


100/300 Hz FILTER OPTION
+18V
TO A3J13-16
-18V
TO A3J13-20
FL1
J1
FL3
J2
A22 100/300 Hz
ASSY
FL2
A2A4S1 IF BANDWIDTH SWITCH
2R-3
W50
A10A1 IF PROCESSOR ASSY
A10A6 LOCAL OSCILLATOR ASSY
W49
J1
J3
A22A1 FILTER
XTAL
L.O
f_L = 23.448 MHz
-22 dBm
J1
21.4 MHz
INPUT
L
R
I
100/300 Hz
BPF
f_0 = 2.048 MHz
A
L
I
R
A22A2 AMPLIFIER
A
10 KHz
BPF
f_0 = 21.4 MHz
FILTER
GAIN ADJUST
A
J2
W49
+3 dBm
W50
A10A1 IF PROCESSOR ASSY
A1A3
J1
J3
A1A2
A1A4
A1A5
1 MHz
100 KHz
10 KHz
1 KHz
A1A1
BAND
COMPENSATION
A
1 MHz
100 KHz
10 KHz
1 KHz
-16 dBm
J4
227 MHz
INPUT
R
I
L
21.4 MHz
A
J2
+13 dBm
21.4 MHz
INPUT
J5
248.4 MHz
INPUT

NOTE: AMPLITUDE LEVELS SHOWN REFER TO
A-10 dBm SIGNAL AT 2.1 GHz IN BAND 2
TO THE RF INPUT OF THE SPECTRUM ANALYZER.

Figure A-1. 100/300 Hz Filter Option, Functional Block Diagram


A2A4 IF BANDWIDTH SWITCH
IF BANDWIDTH (KHZ)
0.1
1
10
100
1000
AUTO
VAR VIDEO
1F
1R
CR2
CR1
CR3
TO A10
TO A12
+18V
TO A7
2F
2R
R1
100K
CW
S2
NC
NO
W2
W1
CCW
CW
AUTO
1000KHZ
100KHZ
10 KHZ
1 KHZ
0.1 KHZ, TO A22

IF BANDWIDTH
0.1
1
10
100
1000
AUTO

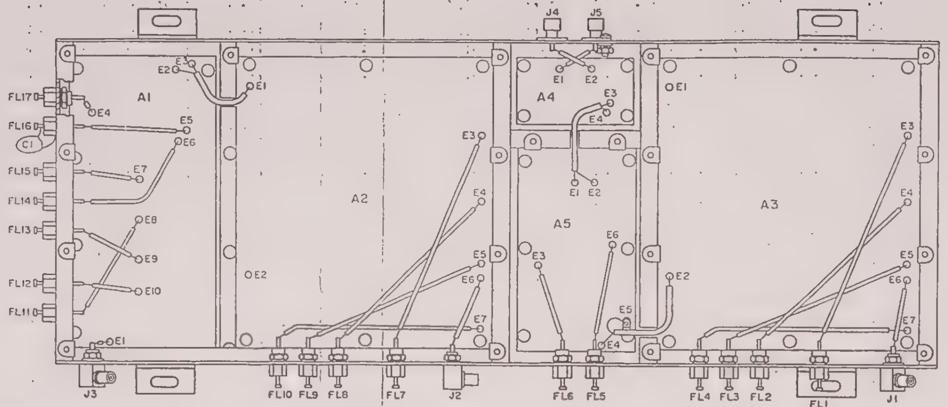
Figure A-2. IF Bandwidth Switch Assembly 1A2A4, Maintenance Schematic Diagram

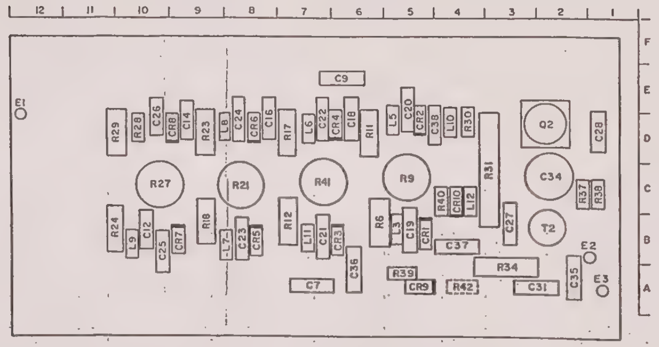
PARTS LOCATION INDEX, IF PROCESSOR 1A10A1A1

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	NOT USED	CR1	5B	R7	NOT USED
C2	NOT USED	CR2	5D	R8	NOT USED
C3	NOT USED	CR3	6B	R9	5C
C4	NOT USED	CR4	6D	R10	NOT USED
C5	NOT USED	CR5	8B	R11	6D
C6	NOT USED	CR6	8D	R12	7B
C7	7A	CR7	10B	R13	NOT USED
C8	NOT USED	CR8	9D	R14	NOT USED
C9	6E	CR9	5A	R15	NOT USED
C10	NOT USED	CR10	4C	R16	NOT USED
C11	NOT USED			R17	7D
C12	10B	E1	12E	R18	9B
C13	NOT USED	E2	1B	R19	NOT USED
C14	9D	E3	1A	R20	NOT USED
C15	NOT USED			R21	8C
C16	8E	L1	NOT USED	R22	NOT USED
C17	NOT USED	L2	NOT USED	R23	9D
C18	6D	L3	5C	R24	11B
C19	5B	L4	NOT USED	R25	NOT USED
C20	5E	L5	5D	R26	NOT USED
C21	7B	L6	7D	R27	10C
C22	7E	L7	8C	R28	10D
C23	8B	L8	8D	R29	11D
C24	8D	L9	10B	R30	4D
C25	10B	L10	4D	R31	3C
C26	10E	L11	7C	R32	NOT USED
C27	3B	L12	4C	R33	NOT USED
C28	1D			R34	3A
C29	NOT USED	Q1	NOT USED	R35	NOT USED
C30	NOT USED	Q2	2D	R36	NOT USED
C31	2A			R37	2C
C32	NOT USED			R38	1C
C33	NOT USED	R1	NOT USED	R39	5A
C34	2C	R2	NOT USED	R40	4C
C35	2A	R3	NOT USED	R41	7C
C36	6A	R4	NOT USED	R42	4A
C37	4B	R5	NOT USED	T1	NOT USED
C38	4D	R6	6B	T2	2B

NOTES:

UNLESS OTHERWISE SPECIFIED
RESISTOR VALUES ARE IN OHMS
CAPACITOR VALUES ARE IN μF.


J4
J5
A1
A2
A3
A4
A5
E1
E2
E3
E4
E5
E6
E7
E8
E9
E10
C1
FL17
FL16
FL15
FL14
FL13
FL12
FL11
FL10
FL9
FL8
FL7
FL6
FL5
FL4
FL3
FL2
FL1
J3
J2
J1


12
11
10
9
8
7
6
5
4
3
2
1
F
E
D
C
B
A
E1
E2
E3
C9
R29
R28
C26
CR8
C14
R23
L8
C24
CR6
C16
R17
L6
C22
CR4
C18
R11
L5
C20
CR2
C38
L10
R30
Q2
C28
R27
R21
R41
R9
R31
C34
R40
CR10
L12
R37
R38
R24
L9
C12
C25
CR7
R18
L7
C23
CR5
R12
L11
C21
CR3
R6
L3
C19
CR1
C27
T2
C37
C36
R34
R39
C7
CR9
R42
C31
C35

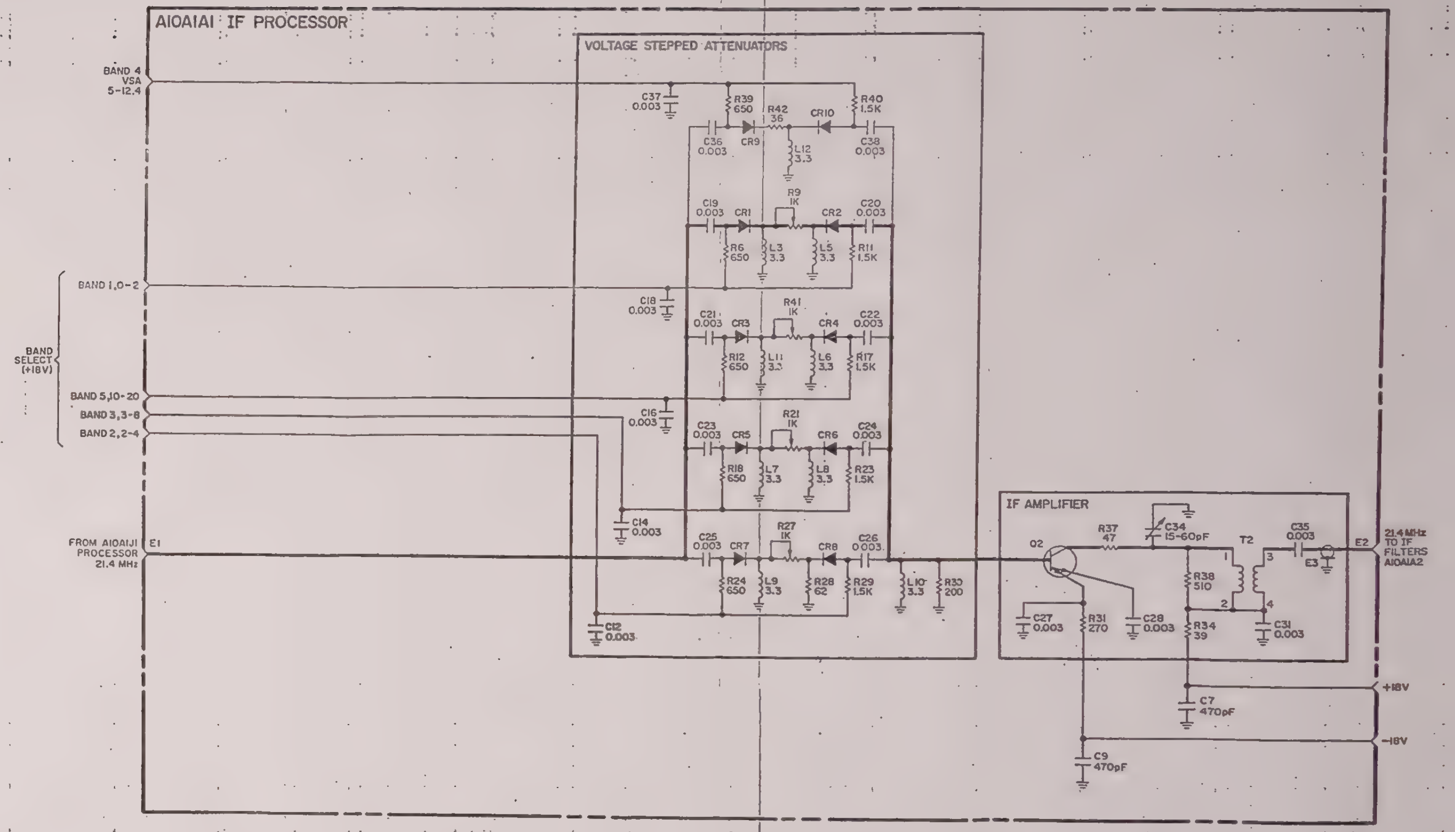

A10A1A1 IF PROCESSOR
VOLTAGE STEPPED ATTENUATORS
IF AMPLIFIER
BAND 4 VSA 5-12.4
BAND SELECT (+18V)
BAND 1,0-2
BAND 5,10-20
BAND 3,3-8
BAND 2,2-4
FROM A10A1J1 PROCESSOR 21.4 MHz
E1
C37 0.003
R39 650
R42 36
CR10
R40 1.5K
C36 0.003
CR9
L12 3.3
C38 0.003
C19 0.003
CR1
R9 1K
CR2
C20 0.003
R6 650
L3 3.3
L5 3.3
R11 1.5K
C18 0.003
C21 0.003
CR3
R41 1K
CR4
C22 0.003
R12 650
L11 3.3
L6 3.3
R17 1.5K
C16 0.003
C23 0.003
CR5
R21 1K
CR6
C24 0.003
R18 650
L7 3.3
L8 3.3
R23 1.5K
C14 0.003
C25 0.003
CR7
R27 1K
CR8
C26 0.003
R24 650
L9 3.3
R28 62
R29 1.5K
L10 3.3
R30 200
C12 0.003
Q2
R37 47
C34 15-60pF
T2
C35 0.003
1
2
3
4
E3
E2
R38 510
R34 39
C27 0.003
R31 270
C28 0.003
C31 0.003
C7 470pF
C9 470pF
21.4 MHz TO IF FILTERS A10A1A2
+18V
−18V

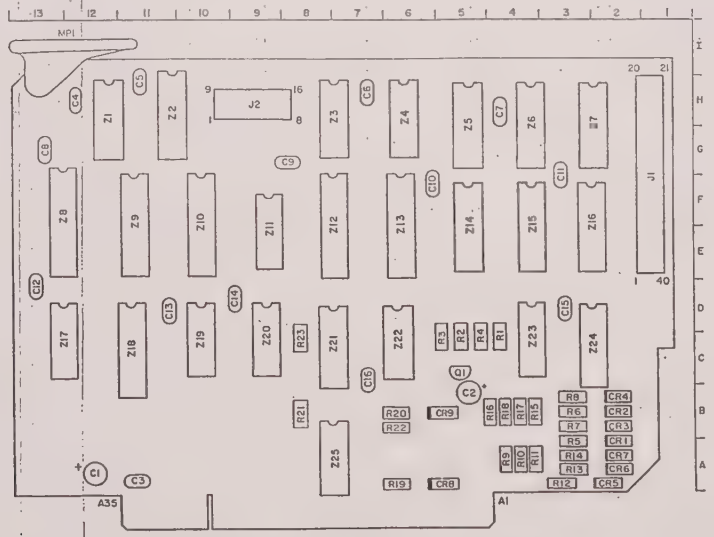
Figure A-3. IF Processor Assembly 1A10A1, Component Location Diagram and IF Processor Printed Circuit Board 1A10A1A1, Maintenance Schematic Diagram

PARTS LOCATION INDEX, CHARACTER GENERATOR AND DATA ENCODER LOGIC NO. 2 1A17

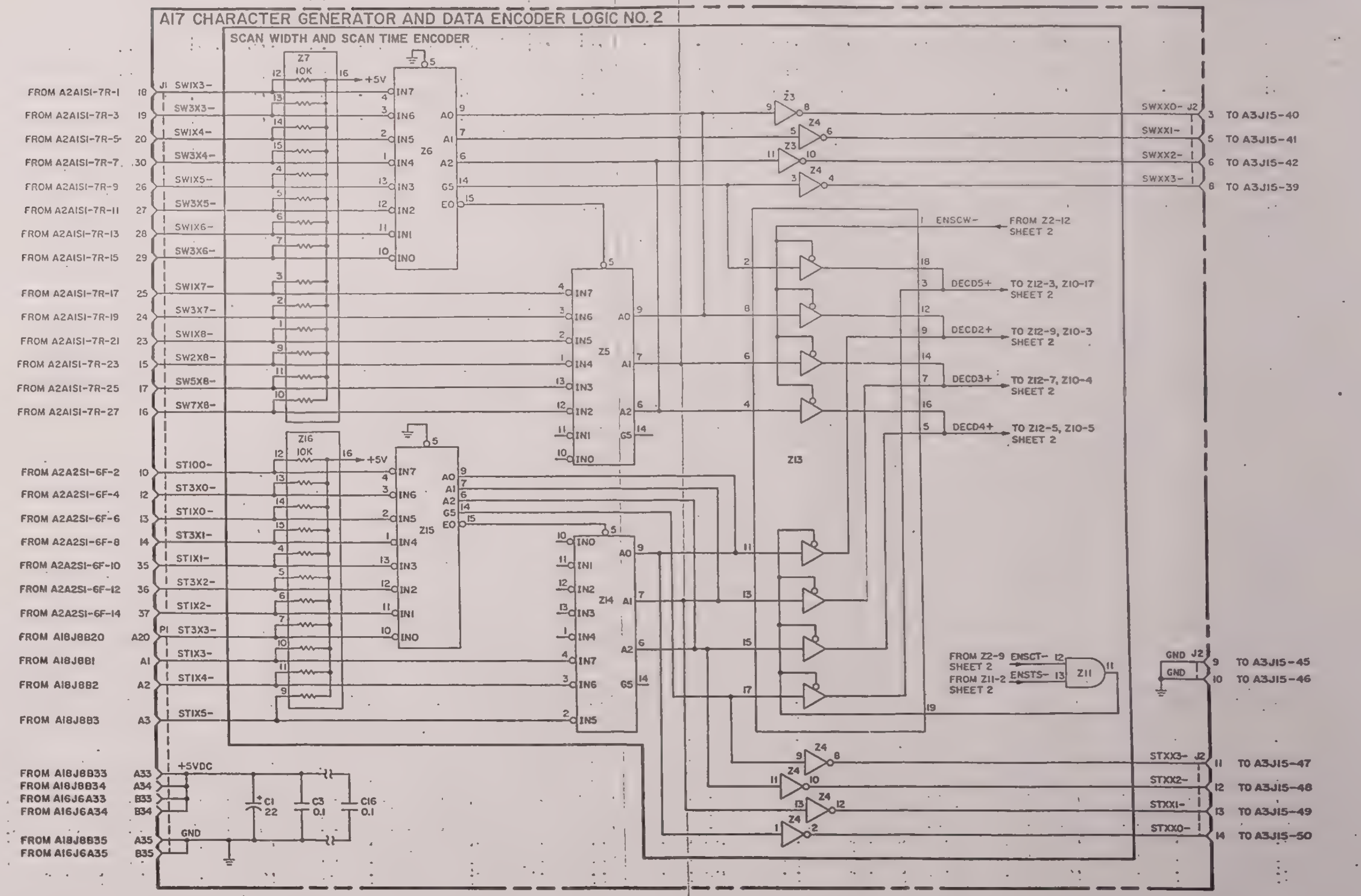
REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	12A	J2	9H	R23	8D
C2	5B				
C3	11A				
C4	12H	Q1	5C	Z1	12H
C5	11H			Z2	11H
C6	7H			Z3	8H
C7	4H	R1	4C	Z4	6H
C8	13G	R2	5C	Z5	5H
C9	8G	R3	5C	Z6	4H
C10	6G	R4	5C	Z7	3H
C11	3G	R5	3A	Z8	13F
C12	13D	R6	3B	Z9	11F
C13	11D	R7	3B	Z10	10F
C14	10D	R8	3B	Z11	9F
C15	3D	R9	4A	Z12	8F
C16	7C	R10	4A	Z13	6F
		R11	4A	Z14	5F
CR1	2A	R12	3A	Z15	4F
CR2	2B	R13	3A	Z16	3F
CR3	2B	R14	3A	Z17	13C
CR4	2B	R15	4B	Z18	11C
CR5	2A	R16	5B	Z19	10C
CR6	2A	R17	4B	Z20	9C
CR7	2A	R18	4B	Z21	8C
CR8	5A	R19	6A	Z22	6C
CR9	5B	R20	6B	Z23	4C
		R21	8B	Z24	3C
J1	1F	R22	6B	Z25	8B

NOTES:

UNLESS OTHERWISE SPECIFIED
RESISTOR VALUES ARE IN OHMS
CAPACITOR VALUES ARE IN µF.



13 12 11 10 9 8 7 6 5 4 3 2 1
I H G F E D C B A
MP1
Z1 Z2 Z3 Z4 Z5 Z6 Z7 Z8 Z9 Z10 Z11 Z12 Z13 Z14 Z15 Z16 Z17 Z18 Z19 Z20 Z21 Z22 Z23 Z24 Z25
J1 J2
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16
Q1
R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R17 R18 R19 R20 R21 R22
CR1 CR2 CR3 CR4 CR5 CR6 CR7 CR8 CR9
A35 A1
20 21 1 40



A17 CHARACTER GENERATOR AND DATA ENCODER LOGIC NO. 2
SCAN WIDTH AND SCAN TIME ENCODER
FROM A2A1S1-7R-1
FROM A2A1S1-7R-3
FROM A2A1S1-7R-5
FROM A2A1S1-7R-7
FROM A2A1S1-7R-9
FROM A2A1S1-7R-11
FROM A2A1S1-7R-13
FROM A2A1S1-7R-15
FROM A2A1S1-7R-17
FROM A2A1S1-7R-19
FROM A2A1S1-7R-21
FROM A2A1S1-7R-23
FROM A2A1S1-7R-25
FROM A2A1S1-7R-27
FROM A2A2S1-6F-2
FROM A2A2S1-6F-4
FROM A2A2S1-6F-6
FROM A2A2S1-6F-8
FROM A2A2S1-6F-10
FROM A2A2S1-6F-12
FROM A2A2S1-6F-14
FROM A18J8B20
FROM A18J8B1
FROM A18J8B2
FROM A18J8B3
FROM A18J8B33
FROM A18J8B34
FROM A16J6A33
FROM A16J6A34
FROM A18J8B35
FROM A16J6A35
J1 P1
SW1X3- SW3X3- SW1X4- SW3X4- SW1X5- SW3X5- SW1X6- SW3X6- SW1X7- SW3X7- SW1X8- SW2X8- SW5X8- SW7X8-
ST100- ST3X0- ST1X0- ST3X1- ST1X1- ST3X2- ST1X2- ST3X3- ST1X3- ST1X4- ST1X5-
Z7 10K
Z16 10K
+5V
+5VDC
GND
Z5 Z6 Z13 Z14 Z15 Z3 Z4 Z11
IN7 IN6 IN5 IN4 IN3 IN2 IN1 IN0 A0 A1 A2 GS EO
C1 22
C3 0.1
C16 0.1
ENSCW- FROM Z2-12 SHEET 2
DECD5+ TO Z12-3, Z10-17 SHEET 2
DECD2+ TO Z12-9, Z10-3 SHEET 2
DECD3+ TO Z12-7, Z10-4 SHEET 2
DECD4+ TO Z12-5, Z10-5 SHEET 2
FROM Z2-9 SHEET 2 ENSCT-
FROM Z11-2 SHEET 2 ENSTS-
SWXX0- J2 3 TO A3J15-40
SWXX1- 5 TO A3J15-41
SWXX2- 6 TO A3J15-42
SWXX3- 8 TO A3J15-39
GND J2 9 TO A3J15-45
GND 10 TO A3J15-46
STXX3- J2 11 TO A3J15-47
STXX2- 12 TO A3J15-48
STXX1- 13 TO A3J15-49
STXX0- 14 TO A3J15-50

Figure A-4. Character Generator and Data Encoder Printed Circuit Board 1A17, Maintenance Schematic Diagram (Sheet 1 of 2)

A-11/12 blank

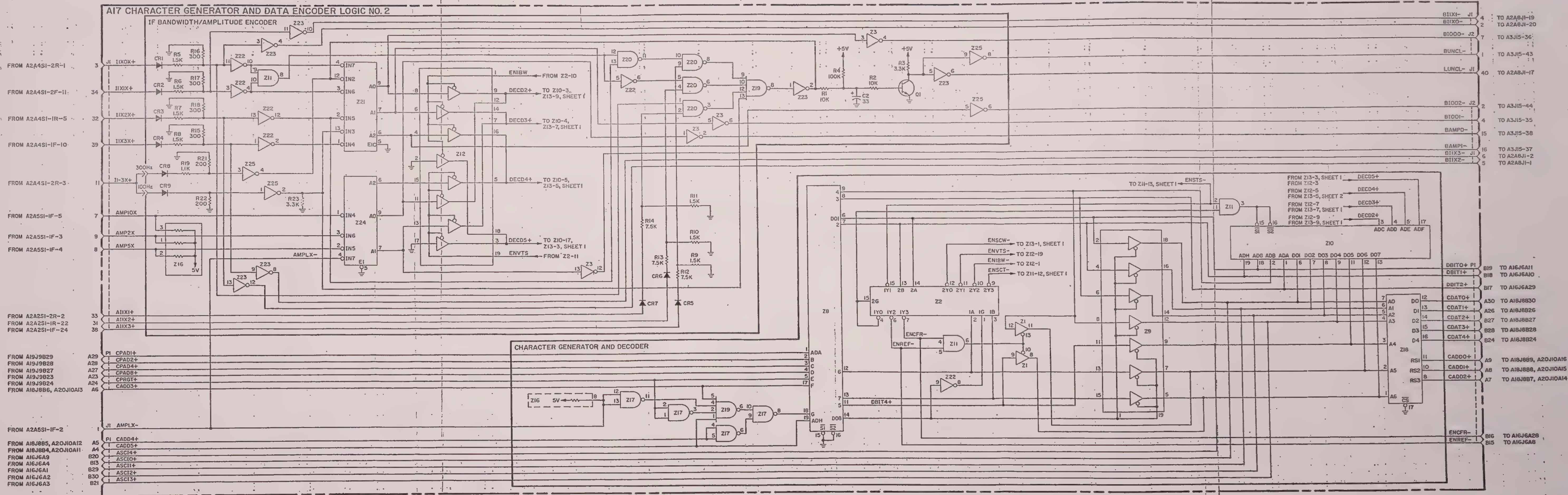

A17 CHARACTER GENERATOR AND DATA ENCODER LOGIC NO. 2
IF BANDWIDTH/AMPLITUDE ENCODER
CHARACTER GENERATOR AND DECODER
FROM A2A4S1-2R-1
FROM A2A4S1-2F-11
FROM A2A4S1-1R-5
FROM A2A4S1-1F-10
FROM A2A4S1-2R-3
FROM A2A5S1-IF-5
FROM A2A5S1-IF-3
FROM A2A5S1-IF-4
FROM A2A2S1-2R-2
FROM A2A2S1-IR-22
FROM A2A2S1-IF-24
FROM A19J9B29
FROM A19J9B28
FROM A19J9B27
FROM A19J9B23
FROM A19J9B24
FROM A18J8B6, A20J10A13
FROM A2A5S1-IF-2
FROM A18J8B5, A20J10A12
FROM A18J8B4, A20J10A11
FROM A16J6A9
FROM A16J6A4
FROM A16J6A1
FROM A16J6A2
FROM A16J6A3
TO A2A8J1-19
TO A2A8J1-20
TO A3J15-36
TO A3J15-43
TO A2A8J1-17
TO A3J15-44
TO A3J15-35
TO A3J15-38
TO A3J15-37
TO A2A8J1-2
TO A2A8J1-1
TO A16J6A11
TO A16J6A10
TO A16J6A29
TO A18J8B30
TO A18J8B26
TO A18J8B27
TO A18J8B28
TO A18J8B24
TO A18J8B9, A20J10A16
TO A18J8B8, A20J10A15
TO A18J8B7, A20J10A14
TO A16J6A28
TO A16J6A8

Figure A-4. Character Generator and Data Encoder Printed Circuit Board 1A17, Maintenance Schematic Diagram (Sheet 2 of 2)

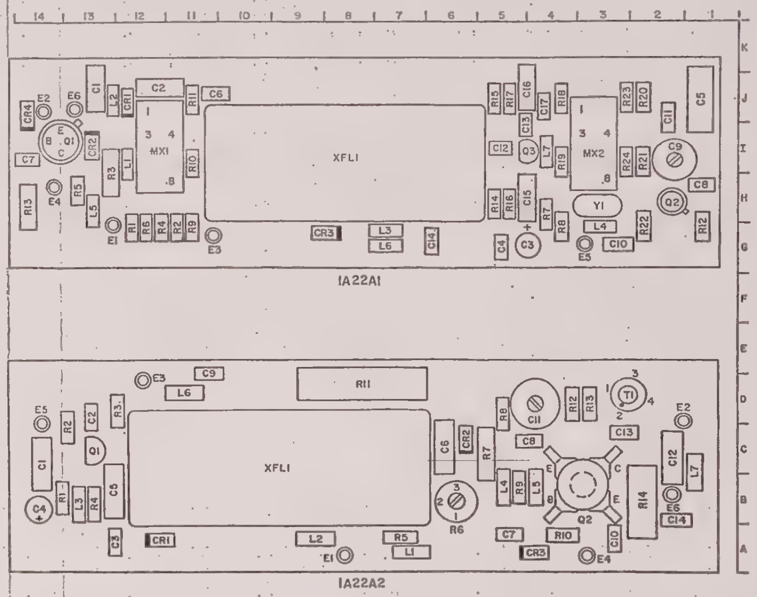
A-13/14 blank

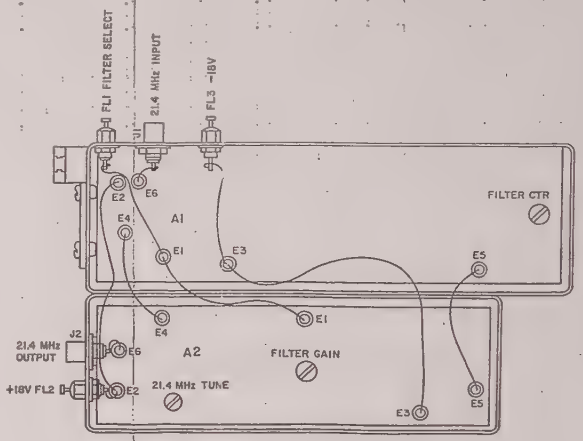
PARTS LOCATION INDEX, FILTER PC BOARD ASSEMBLY 100 HZ, 300 HZ, 1A22A1

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	13J	E3	11G	R5	13H
C2	12J	E4	14H	R6	12G
C3	4G	E5	3G	R7	4H
C4	5G	E6	13J	R8	4G
C5	1J			R9	11G
C6	11J	L1	12I	R10	11I
C7	14I	L2	13J	R11	11J
C8	1H	L3	7G	R12	1G
C9	2I	L4	3G	R13	14H
C10	3G	L5	13H	R14	5H
C11	2J	L6	7G	R15	5J
C12	5I	L7	4I	R16	5H
C13	4I			R17	5J
C14	6C	MX1	12I	R18	4J
C15	4H	MX2	3I	R19	4I
C16	4J			R20	2J
C17	4J	Q1	13I	R21	2I
		Q2	2H	R22	2G
CR1	12J	Q3	4I	R23	3J
CR2	13I			R24	3I
CR3	8G				
CR4	14J	R1	12G		
		R2	11G	XFL1	8I
E1	13G	R3	13I		
E2	14J	R4	12G	Y1	3H

PARTS LOCATION INDEX, AMPLIFIER PC BOARD ASSEMBLY, 1A22A2

REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE	REFERENCE DESIGNATION	ZONE
C1	14C	E1	8A	R2	14D
C2	13D	E2	2D	R3	13D
C3	13A	E3	12D	R4	13B
C4	14B	E4	3A	R5	7A
C5	13B	E5	14D	R6	6B
C6	6C	E6	2B	R7	5C
C7	5A	L1	7A	R8	5D
C8	4C	L2	9A	R9	5B
C9	11E	L3	13B	R10	4A
C10	3A	L4	5B	R11	8D
C11	4D	L5	4B	R12	4D
C12	2C	L6	11D	R13	3D
C13	3C	L7	1C	R14	2B
C14	2B				
		Q1	13C	T1	3D
CR1	12A	Q2	3B		
CR2	6C				
CR3	4A	R1	14B	XFL1	9C

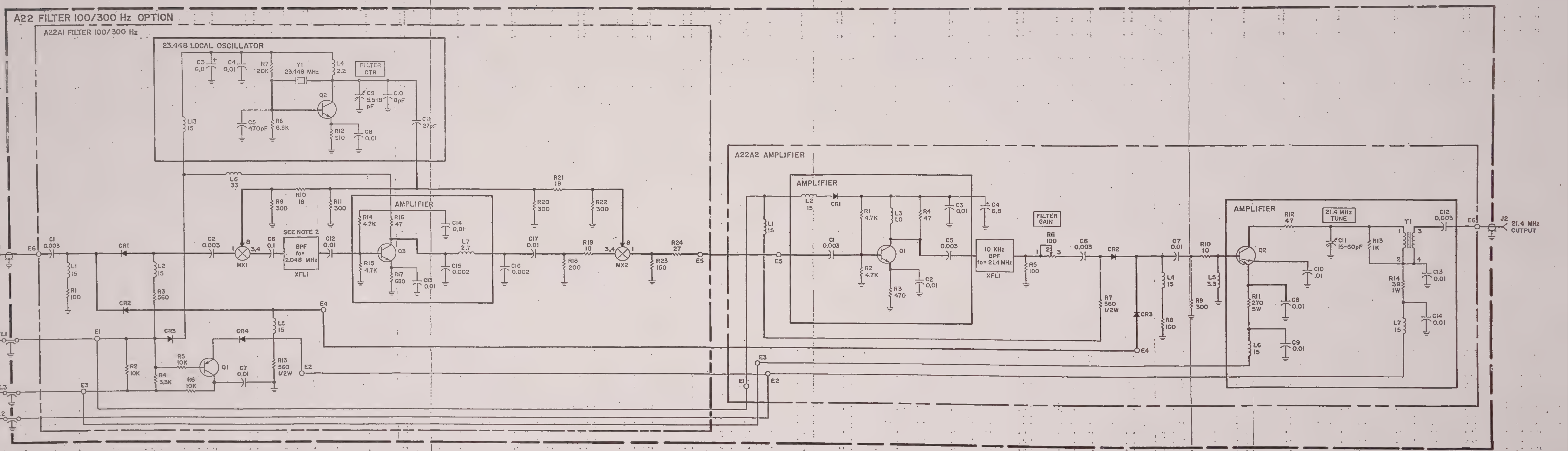

14
13
12
11
10
9
8
7
6
5
4
3
2
1
K
J
I
H
G
F
E
D
C
B
A
XFL1
MX1
MX2
Y1
1A22A1
XFL1
Q2
T1
1A22A2


FL1 FILTER SELECT
J1
21.4 MHz INPUT
FL3 −18V
E2
E6
E4
A1
E1
E3
E5
FILTER CTR
J2
21.4 MHz OUTPUT
E6
E4
A2
E1
FILTER GAIN
+18V FL2
E2
21.4 MHz TUNE
E3
E5

WIRE TERMINATION LIST	
FROM	TO
A1E1	A1FL1
A1E2	A2E2
A1E3	A1FL3
A1E4	A2E4
A1E5	A2E5
A1E6	A1J1
A2E1	A1E1
A2E2	A2FL2
A2E3	A1E3
A2E6	A2J2

Figure A-5. 100/300 Hz Filter Option Assembly 1A22, Component Location Diagrams

A-15/16 blank


A22 FILTER 100/300 Hz OPTION
A22A1 FILTER 100/300 Hz
23.448 LOCAL OSCILLATOR
C3 6.8
C4 0.01
R7 20K
Y1 23.448 MHz
L4 2.2
FILTER CTR
Q2
C9 5.5-18 pF
C10 8pF
C5 470pF
R6 6.8K
R12 910
C8 0.01
L13 15
C11 27pF
L6 33
R10 18
R9 300
R11 300
AMPLIFIER
R14 4.7K
R16 47
C14 0.01
Q3
L7 2.7
R15 4.7K
R17 680
C13 0.01
C15 0.002
C16 0.002
R21 18
R20 300
R22 300
C17 0.01
R18 200
R19 10
MX2
R24 27
R23 150
E5
21.4 MHz INPUT
J1
E6
C1 0.003
L1 15
R1 100
CR1
L2 15
R3 560
CR2
E4
C2 0.003
MX1
C6 0.1
SEE NOTE 2
BPF fo= 2.048 MHz
XFL1
C12 0.01
FILTER SELECT
FL1
E1
CR3
CR4
L5 15
R5 10K
Q1
R2 10K
R4 3.3K
R6 10K
C7 0.01
R13 560 1/2W
E2
-18V
FL3
E3
+18V
FL2
A22A2 AMPLIFIER
AMPLIFIER
L1 15
L2 15
CR1
R1 4.7K
L3 1.0
R4 47
C3 0.01
C4 6.8
C1 0.003
Q1
C5 0.003
R2 4.7K
R3 470
C2 0.01
10 KHz BPF fo= 21.4 MHz
XFL1
FILTER GAIN
R6 100
R5 100
C6 0.003
CR2
R7 560 1/2W
CR3
E4
C7 0.01
L4 15
R8 100
R9 300
R10 10
L5 3.3
AMPLIFIER
R12 47
21.4 MHz TUNE
C11 15-60pF
R13 1K
T1
C12 0.003
Q2
C10 .01
R11 270 5W
C8 0.01
C9 0.01
L6 15
R14 39 1W
C13 0.01
C14 0.01
L7 15
E3
E1
E2
E6
J2
21.4 MHz OUTPUT

NOTES:

1. UNLESS OTHERWISE SPECIFIED;
   ALL CAPACITOR VALUES ARE GIVEN IN uF
   ALL INDUCTOR VALUES ARE GIVEN IN uH
   ALL RESISTOR VALUES ARE GIVEN IN OHMS.
2. A22A1 XFL1 IS 100 Hz FOR-1 ASSY. (757-100)
   A22A1 XFL1 IS 300 Hz FOR-2 ASSY. (757-300)

A-17/18 blank

Figure A-6. 100/300 Hz Filter Option, 1A22 Maintenance Schematic Diagram

Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A1A1CR8	299251-1		DIODE	1N4009	A-3
CR9	299251-1		DIODE	1N4009	
CR10	299251-1		DIODE	1N4009	
E1	990007-001	3	TERMINAL, TURRET	1558-2-05	
E2	990007-001		TERMINAL, TURRET	1558-2-05	
E3	990007-001		TERMINAL, TURRET	1558-2-05	
L1			NOT USED		
L2			NOT USED		
L3	299237-32	8	INDUCTOR, 3.3µH	1025-32	
L4			NOT USED		
L5	299237-32		INDUCTOR, 3.3µH	1025-32	
L6	299237-32		INDUCTOR, 3.3µH	1025-32	
L7	299237-32		INDUCTOR, 3.3µH	1025-32	
L8	299237-32		INDUCTOR, 3.3µH	1025-32	
L9	299237-32		INDUCTOR, 3.3µH	1025-32	
L10	115297-4	1	INDUCTOR, 3.3µH	1840-18	
L11	299237-32		INDUCTOR, 3.3µH	1025-32	
L12	299237-32		INDUCTOR, 3.3µH	1025-32	
Q1			NOT USED		
Q2	230541-1	1	TRANSISTOR	BFR-94	
R1			NOT USED		
R2			NOT USED		
R3			NOT USED		
R4			NOT USED		
R5			NOT USED		
R6	293664	5	RESISTOR, 650Ω, 1W, 1%	RS1A-650	
R7			NOT USED		
R8			NOT USED		
R9	294747	4	RESISTOR, VARIABLE, 1K	3339P-1-102	
R10			NOT USED		
R11	299702-152	5	RESISTOR, 1.5K, 1/2W	RC20GF152J	
R12	293664		RESISTOR, 650Ω, 1W, 1%	RS1A-650	
R13			NOT USED		
R14			NOT USED		
R15			NOT USED		
R16			NOT USED		
R17	299702-152		RESISTOR, 1.5K, 1/2W	RC20GF152J	
R18	293664		RESISTOR, 650Ω, 1W, 1%	RS1A-650	
R19			NOT USED		
R20			NOT USED		
R21	294747		RESISTOR, VARIABLE, 1K	3339P-1-102	
R22			NOT USED		
R23	299702-152		RESISTOR, 1.5K, 1/2W	RC20GF152J	
R24	293664		RESISTOR, 650Ω, 1W, 1%	RS1A-650	
R25			NOT USED		
R26			NOT USED		
R27	294747		RESISTOR, VARIABLE, 1K	3339P-1-102	
R28	299701-620	1	RESISTOR, 62Ω, 1/4W	RC07GF620J	
R29	299702-152		RESISTOR, 1.5K, 1/2W	RC20GF152J	
R30	299701-201	1	RESISTOR, 200Ω, 1/4W	RC07GF201J	
R31	293668	1	RESISTOR, 270Ω, 5W, 5%	RS5-270	
R32			NOT USED		
R33			NOT USED		
R34	299703-390	1	RESISTOR, 39Ω, 1W, 5%	RC32GF390J	
R35			NOT USED		

Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A10A1A1R36			NOT USED		
R37	299701-470	1	RESISTOR, 47Ω, 1/4W	RC07GF470J	A-3
R38	299701-511	1	RESISTOR, 510Ω, 1/4W	RC07GF511J	
R39	293664		RESISTOR, 650Ω, 1W, 1%	RS1A-650	
R40	294747		RESISTOR, 1.5K 1/2K	RC20GF152J	
R41	299702-152		RESISTOR, VARIABLE, 1K	3339P-1-102	
R42	299701-360	1	RESISTOR, 360Ω, 1/4W	RC07GF360J	
T1			NOT USED		
T2	230531-3	1	TRANSFORMER	230531-3	
1A17	296496	1	CHARACTER GEN AND DATA ENCODER PCB ASSEMBLY	296496	A-4
C1	299240-2	1	CAPACITOR, 22μF	T368B226M015AS	
C2	299240-10	1	CAPACITOR, 33μF	T368B336M10AS	
C3	293294-2	14	CAPACITOR, 0.1μF	CY20C104P	
C4	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C5	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C6	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C7	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C8	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C9	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C10	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C11	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C12	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C13	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C14	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C15	293294-2		CAPACITOR, 0.1μF	CY20C104P	
C16	293294-2		CAPACITOR, 0.1μF	CY20C104P	
CR1	293240-1	9	DIODE	1N914	
CR2	293240-1		DIODE	1N914	
CR3	293240-1		DIODE	1N914	
CR4	293240-1		DIODE	1N914	
CR5	293240-1		DIODE	1N914	
CR6	293240-1		DIODE	1N914	
CR7	293240-1		DIODE	1N914	
CR8	293240-1		DIODE	1N914	
CR9	293240-1		DIODE	1N914	
J1	294213-4	1	HEADER, RIGHT ANGLE, 40 PIN	2-87230-0	
J2	299935-1	1	HEADER, RIGHT ANGLE, 16 PIN	87230-8	
MP1	294968-2	1	EJECTOR, WHITE	5005-08N	
Q1	294157-1	1	TRANSISTOR	2N4401	
R1	299700-103	2	RESISTOR, 10K, 1/8W	RC05GF103J	
R2	299700-103		RESISTOR, 10K, 1/8W	RC05GF103J	
R3	299700-332	2	RESISTOR, 3.3K, 1/8W	RC05GF332J	
R4	299700-104	1	RESISTOR, 100K, 1/8W	RC05GF104J	
R5	299700-152	7	RESISTOR, 1.5K, 1/8W	RC05GF152J	
R6	299700-152		RESISTOR, 1.5K, 1/8W	RC05GF152J	
R7	299700-152		RESISTOR, 1.5K, 1/8W	RC05GF152J	
R8	299700-152		RESISTOR, 1.5K, 1/8W	RC05GF152J	
R9	299700-152		RESISTOR, 1.5K, 1/8W	RC05GF152J	
R10	299700-152		RESISTOR, 1.5K, 1/8W	RC05GF152J	
R11	299700-152		RESISTOR, 1.5K, 1/8W	RC05GF152J	
R12	299700-752	3	RESISTOR, 7.5K, 1/8W	RC05GF752J	
R13	299700-752		RESISTOR, 7.5K, 1/8W	RC05GF752J	
R14	299700-752		RESISTOR, 7.5K, 1/8W	RC05GF752J	
R15	299700-301	4	RESISTOR, 300Ω, 1/8W	RC05GF301J	
R16	299700-301		RESISTOR, 300Ω, 1/8W	RC05GF301J	

Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A17R17	299700-301		RESISTOR, 300Ω, 1/8W	RC05GF301J	A-4
R18	299700-301		RESISTOR, 300Ω, 1/8W	RC05GF301J	
R19	299700-112	2	RESISTOR, 1.1K, 1/8W	RC05GF112J	
R20	299700-112		RESISTOR, 1.1K, 1/8W	RC05GF112J	
R21	299700-201	2	RESISTOR, 200Ω, 1/8W	RC05GF201J	
R22	299700-201		RESISTOR, 200Ω, 1/8W	RC05GF201J	
R23	299700-332		RESISTOR, 3.3K, 1/8W	RC05GF332J	
XZ1	294573-1	10	SOCKET, IC, 14 PIN	C931410	
XZ2	294567-1	9	SOCKET, IC, 16 PIN	C931610	
XZ3	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ4	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ5	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ6	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ7	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ8	294595-1	5	SOCKET, IC, 20 PIN	C932010	
XZ9	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ10	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ11	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ12	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ13	294595-1		SOCKET, IC, 20 PIN	C932010	
XZ14	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ15	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ16	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ17	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ18	294574-1		SOCKET, IC, 18 PIN	C931810	
XZ19	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ20	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ21	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ22	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ23	294573-1		SOCKET, IC, 14 PIN	C931410	
XZ24	294567-1		SOCKET, IC, 16 PIN	C931610	
XZ25	294573-1		SOCKET, IC, 14 PIN	C931410	
Z1	293541-4	1	INTEGRATED CIRCUIT	SN74LS125N	
Z2	293541-5	1	INTEGRATED CIRCUIT	SN74LS139N	
Z3	293446-1	4	INTEGRATED CIRCUIT	SN7416N	
Z4	293446-1		INTEGRATED CIRCUIT	SN7416N	
Z5	293541-6	4	INTEGRATED CIRCUIT	SN74LS348N	
Z6	293541-6		INTEGRATED CIRCUIT	SN74LS348N	
Z7	293691-6	2	INTEGRATED CIRCUIT	316A103	
Z8	294596-2	1	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS471	
Z9	293541-7	3	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS244N	
Z10	294596-3	1	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS471N	
Z11	293437-1	1	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS08N	
Z12	293541-7		INTEGRATED CIRCUIT, PROGRAMMED	SN74LS244N	
Z13	293541-7		INTEGRATED CIRCUIT, PROGRAMMED	SN74LS244N	
Z14	293541-6		INTEGRATED CIRCUIT	SN74LS348N	
Z15	293541-6		INTEGRATED CIRCUIT	SN74LS348N	
Z16	293691-6		INTEGRATED CIRCUIT	316A103	
Z17	293541-1	2	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS00N	
Z18	294594-1	1	INTEGRATED CIRCUIT, PROGRAMMED	MCM6674P	
Z19	293544-1	1	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS20N	
Z20	293541-1		INTEGRATED CIRCUIT, PROGRAMMED	SN74LS00N	
Z21	293541-8	2	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS148N	
Z22	293540-1	1	INTEGRATED CIRCUIT, PROGRAMMED	SN74LS04N	
Z23	293446-1		INTEGRATED CIRCUIT	SN7416N	

Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A17Z24	293541-8		INTEGRATED CIRCUIT, PROGRAMMED	SN74LS148N	A-4
Z25	293446-1		INTEGRATED CIRCUIT, PROGRAMMED	SN7416N	
1A22	296500-1	1	FILTER ASSEMBLY, 100 HZ	296500-1	A-5
	296500-2	1	FILTER ASSEMBLY, 300 HZ	296500-2	
FL1	294211-1	3	FILTER, FEEDTHROUGH	294211-1	
FL2	294211-1		FILTER, FEEDTHROUGH	294211-1	
FL3	294211-1		FILTER, FEEDTHROUGH	294211-1	
J1	295396-1	2	JACK, BULKHEAD RIGHT ANGLE	295396-1	
J2	295396-1		JACK, BULKHEAD RIGHT ANGLE	295396-1	
1A22A1	296476-1	1	FILTER 100 HZ, PC BOARD ASSEMBLY	296476-1	A-5
	296476-2	1	FILTER 300 HZ, PC BOARD ASSEMBLY	296476-2	
C1	293810-1	2	CAPACITOR, .003μF	DD302	
C2	293810-1		CAPACITOR, .003μF	DD302	
C3	299240-1	1	CAPACITOR, 6.8μF, 35V	T3688685M035AS	
C4	299245-2	7	CAPACITOR, .01μF, 50V	8121-050-651-104M	
C5	299250-471	1	CAPACITOR, 470ρF	CM06FD471J03	
C6	299245-1	1	CAPACITOR, 0.1μF, 50V	8121-050-651-103M	
C7	299245-2		CAPACITOR, .01μF, 50V	8121-050-651-103M	
C8	299245-2		CAPACITOR, .01μF, 50V	8121-050-651-103M	
C9	293922-1	1	CAPACITOR, VARIABLE 5.5 18ρF	538-011-A5	
C10	299291-080	1	CAPACITOR, 8ρF	DM5CC-080D	
C11	299241-270	1	CAPACITOR, 27ρF	DM5EC-270J	
C12	299245-2		CAPACITOR, .01μF, 50V	8121-050-651-104M	
C13	299245-2		CAPACITOR, .01μF, 50V	8121-050-651-104M	
C14	299245-2		CAPACITOR, .01μF, 50V	8121-050-651-104M	
C15	293808-1	2	CAPACITOR, .002μF	DD202	
C16	293808-1		CAPACITOR, .002μF	DD202	
C17	299245-2		CAPACITOR, .01μF, 50V	8121-050-651-104M	
CR1	299251-1	4	DIODE	1N4009	
CR2	299251-1		DIODE	1N4009	
CR3	299251-1		DIODE	1N4009	
CR4	299251-1		DIODE	1N4009	
E1	293310-1	6	TERMINAL	1597-2-01	
E2	293310-1		TERMINAL	1597-2-01	
E3	293310-1		TERMINAL	1597-2-01	
E4	293310-1		TERMINAL	1597-2-01	
E5	293310-1		TERMINAL	1597-2-01	
E6	293310-1		TERMINAL	1597-2-01	
L1	299237-48	4	INDUCTOR, 15μH	1025-48	
L2	299237-48		INDUCTOR, 15μH	1025-48	
L3	299237-48		INDUCTOR, 15μH	1025-48	
L4	299237-28	1	INDUCTOR, 2.2μH	1025-28	
L5	299237-48		INDUCTOR, 15μH	1025-48	
L6	299237-56	1	INDUCTOR, 33μH	1025-56	
L7	299237-30	1	INDUCTOR, 2.7μH	1025-30	
MX1	231104-1	2	MIXER	SRA-1	
MX2	231104-1		MIXER	SRA-1	
Q1	294126	1	TRANSISTOR	2N2905	
Q2	299239-1	1	TRANSISTOR	2N5179	
Q3	294151-1	1	TRANSISTOR	2N4124	
R1	299701-101	1	RESISTOR, 100Ω, 1/4W	RC07GF101J	
R2	299701-103	3	RESISTOR, 10K, 1/4W	RC07GF103J	

Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A22A1R3	299702-561	2	RESISTOR, 560Ω, 1/2W	RC20GF561J	A-5
R4	299701-332	1	RESISTOR, 3.3K, 1/4W	RC07GF332J	
R5	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R6	299701-103		RESISTOR, 10K, 1/4W	RC07GF103J	
R7	299701-203	1	RESISTOR, 20K, 1/4W	RC07GF203J	
R8	299701-682	1	RESISTOR, 6.8K, 1/4W	RC07GF682J	
R9	299701-301	4	RESISTOR, 300Ω, 1/4W	RC07GF301J	
R10	299701-180	2	RESISTOR, 18Ω, 1/4W	RC07GF180J	
R11	299701-301		RESISTOR, 300Ω, 1/4W	RC07GF301J	
R12	299701-911	1	RESISTOR, 910Ω, 1/4W	RC07GF911J	
R13	299702-561	1	RESISTOR, 560Ω, 1/4W	RC20GF561J	
R14	299701-472	2	RESISTOR, 4.7K, 1/4W	RC07GF472J	
R15	299701-472		RESISTOR, 4.7K, 1/4W	RC07GF472J	
R16	299701-470	1	RESISTOR, 47Ω, 1/4W	RC07GF470J	
R17	299701-681	1	RESISTOR, 680Ω, 1/4W	RC07GF681J	
R18	299701-201	1	RESISTOR, 200Ω, 1/4W	RC07GF201J	
R19	299701-100	1	RESISTOR, 10Ω, 1/4W	RC07GF100J	
R20	299701-301		RESISTOR, 300Ω, 1/4W	RC07GF301J	
R21	299701-180		RESISTOR, 18Ω, 1/4W	RC07GF180J	
R22	299701-301		RESISTOR, 300Ω, 1/4W	RC07GF301J	
R23	299701-151	1	RESISTOR, 150Ω, 1/4W	RC07GF151J	
R24	299701-270	1	RESISTOR, 27Ω, 1/4W	RC07GF270J	
XFL1	295316-1	1	FILTER, CRYSTAL, 100 HZ	295316-1	
XFL1	296472-1	1	FILTER, CRYSTAL, 300 HZ	296472-1	
Y1	230479-9	1	CRYSTAL, 23.448 MHZ	230479-9	
A22A2	296478-1	1	AMPLIFIER, PC BOARD ASSEMBLY	296478-1	A-5
C1	293810-1	4	CAPACITOR, .003μF	DD302	
C2	299245-2	8	CAPACITOR, .01μF, 50V	8121-M058-651-103M	
C3	299245-2		CAPACITOR, .01μF, 50V	8121-M058-651-103M	
C4	299240-1	1	CAPACITOR, 6.8μF, 35V	T3688685M035AS	
C5	293810-1		CAPACITOR, .003μF	DD302	
C6	293810-1		CAPACITOR, .003μF	DD302	
C7	299245-2		CAPACITOR, .01μF, 50V	8121-M058-651-103M	
C8	299245-2		CAPACITOR, .01μF, 50V	8121-M058-651-103M	
C9	299245-2		CAPACITOR, .01μF, 50V	8121-M058-651-103M	
C10	299245-2		CAPACITOR, .01μF, 50V	8121-M058-651-103M	
C11	293747-1	1	CAPACITOR, VARIABLE, 15-60pF	538-011-F15-60	
C12	293810-1		CAPACITOR, .003μF	DD302	
C13	299245-2		CAPACITOR, .01μF, 50V	8121-M058-651-103M	
C14	299245-2		CAPACITOR, .01μF, 50V	8121-M058-651-103M	
CR1	299251-1	3	DIODE	1N4009	
CR2	299251-1		DIODE	1N4009	
CR3	299251-1		DIODE	1N4009	
E1	293310-1	6	TERMINAL	1597-2-01	
E2	293310-1		TERMINAL	1597-2-01	
E3	293310-1		TERMINAL	1597-2-01	
E4	293310-1		TERMINAL	1597-2-01	
E5	293310-1		TERMINAL	1597-2-01	
E6	293310-1		TERMINAL	1597-2-01	
L1	299237-48		INDUCTOR, 15μH	1025-48	
L2	299237-48	5	INDUCTOR, 15μH	1025-48	
L3	299237-20	1	INDUCTOR, 1.0μH	1025-20	
L4	299237-48		INDUCTOR, 15μH	1025-48	

Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A22A2L5	299237-32	1	INDUCTOR, 3.3µH	1025-32	A-5
L6	299237-48		INDUCTOR, 15µH	1025-48	
L7	299237-48		INDUCTOR, 15µH	1025-48	
Q1	294151-1	1	TRANSISTOR	2N4124	
Q2	230541-1	1	TRANSISTOR	BFR-94	
R1	299701-472	2	RESISTOR, 4.7K, 1/4W	RC07GF472J	
R2	299701-472		RESISTOR, 4.7K, 1/4W	RC07GF472J	
R3	299701-471	1	RESISTOR, 470Ω, 1/4W	RC07GF471J	
R4	299701-470	2	RESISTOR, 47Ω, 1/4W	RC07GF470J	
R5	299701-101	2	RESISTOR, 100Ω, 1/4W	RC07GF101J	
R6	296746-1	1	RESISTOR, VARIABLE, 100Ω	3339P-1-101	
R7	299702-561	1	RESISTOR, 560Ω, 1/2W	RC20GF561J	
R8	299701-101		RESISTOR, 100Ω, 1/4W	RC07GF101J	
R9	299701-301	1	RESISTOR, 300Ω, 1/4W	RC07GF301J	
R10	299701-100	1	RESISTOR, 10Ω, 1/4W	RC07GF100J	
R11	293668-1	1	RESISTOR, 270Ω, 5W	RS5-270	
R12	299701-470		RESISTOR, 47Ω, 1/4W	RC07GF470J	
R13	299701-102	1	RESISTOR, 1K, 1/4W	RC07GF102J	
R14	299703-390	1	RESISTOR, 39Ω, 1W	RC32GF390J	
T1	230531-3	1	TRANSFORMER	230531-3	
XFL1	231012-2	1	FILTER, CRYSTAL	231012-2	

SECTION 8

REPLACEABLE PARTS LIST

8-1. INTRODUCTION

8-2. This section contains the replaceable parts list for the AILTECH 757 Spectrum Analyzer. The parts list contains the reference designation, AILTECH part number, quantity, description, manufacturer's part number, and figure number where part appears.

8-3. LIST OF MAJOR COMPONENTS

8-4. Table 8-1 provides a list of major components for the AILTECH 757 Spectrum Analyzer. The table gives the reference designation, name, and part number of each component.

8-5. REPLACEABLE PARTS LIST

8-6. Table 8-2 provides a list of replaceable parts for the AILTECH 757 Spectrum Analyzer.

8-7. RECOMMENDED SPARE PARTS LIST

8-8. Table 8-3 contains a listing of recommended spare parts that should be maintained in case of a failure of the AILTECH 757 Spectrum Analyzer.

Table 8-1. List of Major Components

Reference Designation	Name	Part Number
1	Spectrum Analyzer 757	296125-1
1A1	Interconnecting Board Assembly	296287-1
1A1A1	Interconnecting Motherboard Assembly	296222-1
1A2	Front Panel Assembly	296158-1
1A2A1	Scan Width Switch Assembly	299475-2
1A2A2	Scan Time Switch Assembly	296256-1
1A2A3	RF Range Switch Assembly	299302-3
1A2A4	IF Bandwidth Switch Assembly	295898-2
1A2A5	Vertical Scale Switch Assembly	295821-2
1A2A6	Scan Mode Switch Assembly	296257-1
1A2A7	Calibrate Indicator Assembly	296310-1
1A2A8	Bandwidth PC Board Assembly	296230-1

Table 8-1. List of Major Components (Continued)

Reference Designation	Name	Part Number
1A2A9	Pushbutton Switch, 5 Function	296232-1
1A2A10	Pushbutton Switch, 4 Function	296234-1
1A2A11	Frequency Readout PC Board Assembly	296026-1
1A2A12	Tuner Assembly	299137-2
1A2A13	IF Attenuator Assembly	295858-2
1A2A14	RF Attenuator Assembly	295835-1
1A2A15	Signal Center Assembly	299735-1
1A2A16	Baseline/Contrast Assembly	299364-1
1A2A17	Control Panel Assembly	296152-1
1A2A18	RF Switch	231079-1
1A3	Rear Panel Assembly	296252-1
1A4	Low Voltage Power Supply	296004-901
1A5	CRT Display Assembly	296154-1
1A6	Absolute Power Board Assembly	295852-2
1A7	Attenuator Fixed	230195-6
1A8	Log IF Amplifier Assembly	296123-1
1A8A1	Log IF Amplifier PC Assembly	296119-1
1A9	Comb Generator	230471-2
1A10	RF/IF Assembly	296225-1
1A10A1	IF Processor Assembly	296236-1
1A10A1A1	Processor PC Board Assembly	299335-3
1A10A1A2	Filter Board Assembly	230302-7
1A10A1A3	Filter Board Assembly	230302-8

Table 8-1. List of Major Components (Continued)

Reference Designation	Name	Part Number
1A10A1A4	Mixer PC Board Assembly	230627-1
1A10A1A5	IF Amplifier PC Board Assembly	230394-1
1A10A2	Yig Oscillator-Tuned	295933-1
1A10A3	Yig Filter	299463-2
1A10A4	Mixer Bias Assembly	230500-1
1A10A5	Loop Control Assembly	296237-1
1A10A5A1	Loop Control PC Board Assembly	299459
1A10A5A2	3.5 MHz Oscillator PC Board Assembly	230410-1
1A10A5A3	Comb Source PC Board Assembly	230402-1
1A10A5A4	100 MHz Oscillator PC Board Assembly	230683-1
1A10A6	Local Oscillator Assembly	296238-1
1A10A6A1	LCVCO Shaper PC Board Assembly	296455
1A10A6A2	LCVCO Oscillator II PC Board Assembly	231089-1
1A10A7	RF Switch	231079-1
1A10A8	RF Switch	231079-1
1A10A9	RF Switch	231079-1
1A10A10	RF Switch	231079-1
1A10A11	Low Pass Filter	230191-1
1A10A12	Yig Driver PC Board Assembly	299395-4
1A10A13	Microwave Mixer	230567-2
1A10A14	Attenuator Fixed	230195-5
1A10A15	Attenuator Fixed	230195-1
1A10A16	Coupler, 6 dB	230194
1A10A17	Harmonic Mixer	230478

Table 8-1. List of Major Components (Continued)

Reference Designation	Name	Part Number
1A10A18	RF Amplifier Assembly	230625
1A10A19	Coupler, 6 dB	230194
1A10A20	227 MHz Bandpass Filter	299374
1A10A21	Isolator 40 dB	230215
1A10A22	Fixed Attenuator	294468
1A10A23	Loop Mixer	230224
1A10A24	Comb Generator	230471-2
1A10A25	Fixed Attenuator	230195-3
1A10A26	2060 MHz Oscillator Assembly	230817
1A10A27	Not Used	
1A10A28	Not Used	
1A10A29	RF Switch	231079-1
1A10A30	RF Switch	231079-1
1A10A31	RF Amplifier Assembly	230625
1A10A32	Heat Sink Assembly Yig Driver	299400-2
1A10A33	RF Switch	231079-1
1A10A34	RF Switch	231079-1
1A10A35	Coupler, 6 dB	230194
1A11	Sweep Generator PC Board Assembly	296200-1
1A12	Processed Video PC Board Assembly	296202-1
1A13	Regulator Bias PC Board Assembly	296204-1
1A14	Digital Display PC Board Assembly No. 2	296206-1
1A15	Digital Display PC Board Assembly No. 1	296208-1

Table 8-1. List of Major Components (Continued)

Reference Designation	Name	Part Number
1A16	Frequency and Power Reference PC Board Assembly	296210-1
1A17	Character Generator and Data Encoder PC Board Assembly	296212-1
1A18	Horizontal Timing PC Board Assembly	296214-1
1A19	Display Timing and Horizontal Output PC Board Assembly	296216-1
1A20	Pushbutton Interface/Line Generator PC Board Assembly	296218-1
1A21	Data Digitizer and Memory Logic No. 6 PC Board Assembly	296220-1

Table 8-2. Replaceable Parts List

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1	296125-1	1	757 SPECTRUM ANALYZER	296125-1	3-1
1A1	296287-1	1	INTERCONNECTING BOARD ASSEMBLY	296287-1	
1A1A1	296222-1	1	INTERCONNECTING MOTHER BOARD	296222-1	7-44
E1	293050-2	35	TERMINAL	60753-2	
E2	293050-2		TERMINAL	60753-2	
E3	293050-2		TERMINAL	60753-2	
E4	293050-2		TERMINAL	60753-2	
E5	293050-2		TERMINAL	60753-2	
E6	293050-2		TERMINAL	60753-2	
E7	293050-2		TERMINAL	60753-2	
E8	293050-2		TERMINAL	60753-2	
E9	293050-2		TERMINAL	60753-2	
E10	293050-2		TERMINAL	60753-2	
E11	293050-2		TERMINAL	60753-2	
E12	293050-2		TERMINAL	60753-2	
E13	293050-2		TERMINAL	60753-2	
E14	293050-2		TERMINAL	60753-2	
E15	293050-2		TERMINAL	60753-2	
E16	293050-2		TERMINAL	60753-2	
E17	293050-2		TERMINAL	60753-2	
E18	293050-2		TERMINAL	60753-2	
E19	293050-2		TERMINAL	60753-2	
E20	293050-2		TERMINAL	60753-2	
E21	293050-2		TERMINAL	60753-2	
E22	293050-2		TERMINAL	60753-2	
E23	293050-2		TERMINAL	60753-2	
E24			NOT USED		
E25			NOT USED		
E26	293050-2		TERMINAL	60753-2	
E27	293050-2		TERMINAL	60753-2	
E28	293050-2		TERMINAL	60753-2	
E29	293050-2		TERMINAL	60753-2	
E30	293050-2		TERMINAL	60753-2	
E31	293050-2		TERMINAL	60753-2	
E32	293050-2		TERMINAL	60753-2	
E33	293050-2		TERMINAL	60753-2	
E34	293050-2		TERMINAL	60753-2	
E35	293050-2		TERMINAL	60753-2	
E36	293050-2		TERMINAL	60753-2	
E37	293050-2		TERMINAL	60753-2	
J1	294408-5	6	CONNECTOR	3VH25/1JDD3	
J2	294408-5		CONNECTOR	3VH25/1JDD3	
J3	294408-5		CONNECTOR	3VH25/1JDD3	
J4	294408-5		CONNECTOR	3VH25/1JDD3	
J5	294408-5		CONNECTOR	3VH25/1JDD3	
J6	294408-6	6	CONNECTOR	3VH35/1JDD3	
J7	294408-6		CONNECTOR	3VH35/1JDD3	
J8	294408-6		CONNECTOR	3VH35/1JDD3	
J9	294408-6		CONNECTOR	3VH35/1JDD3	
J10	294408-6		CONNECTOR	3VH35/1JDD3	
J11	294408-6		CONNECTOR	3VH35/1JDD3	
J12	294408-5		CONNECTOR	3VH25/1JDD3	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A2	296158-1	1	FRONT PANEL ASSEMBLY	296158-1	7-6
CR1	299251-001	2	DIODE	1N4009	
CR2	299251-001		DIODE	1N4009	
E1	990313-2	1	TERMINAL GND	SE26XF02	
E2	293317-2	2	TERMINAL	4870-3-0519	
E3	293317-2		TERMINAL	4870-3-0519	
R1	296251-1	1	FREQ ADJ, RESISTOR, VARIABLE	296251-1	
R2	296251-2	1	VIDEO TRIG, RESISTOR, VARIABLE	296251-2	
R3	299701-821	2	RESISTOR, 820Ω, 1/4W	RC07GF821J	
R4	299701-821		RESISTOR, 820Ω, 1/4W	RC07GF821J	
S1	296249-1	1	POWER ON/OFF, SWITCH	296249-1	
S2	296250-1	1	AMP ADJ, SWITCH	296250-1	
S3	296246-1	1	PRESELECTOR, SWITCH, SLIDE	296246-1	
S4	296247-1	1	CALIBRATE, SWITCH, PUSHBUTTON	296247-1	
S5	231079-1	1	RF SWITCH	231079-1	
W1	296124-1	1	CABLE ASSEMBLY	296124-1	
W2	298505-112	1	CABLE ASSEMBLY	298505-112	
W3	298505-93	1	CABLE ASSEMBLY	298505-93	
1A2A1	299475-2	1	SCAN WIDTH/DIV SWITCH ASSEMBLY	299475-2	7-7
C1	299240-1	1	CAPACITOR, 6.8μF	T368B225M035AS	
E1	990203-1	1	TERMINAL, LUG	990203-1	
R1	299709-219	2	RESISTOR, 100Ω, 1/8W	RN60C1000F	
R2	299709-219		RESISTOR, 100Ω, 1/8W	RN60C1000F	
R3	299709-322	4	RESISTOR, 1K, 1/8W	RN60C1001F	
R4	299709-322		RESISTOR, 1K, 1/8W	RN60C1001F	
R5	299709-322		RESISTOR, 1K, 1/8W	RN60C1001F	
R6	299709-234	1	RESISTOR, 143Ω, 1/8W	RN60C1430F	
R7	299709-285	1	RESISTOR, 442Ω, 1/8W	RN60C4420F	
R8	299709-343	1	RESISTOR, 1.65K, 1/8W	RN60C1651F	
R9	299709-380	1	RESISTOR, 4.02K, 1/8W	RN60C4021F	
R10	299709-459	1	RESISTOR, 24.9K, 1/8W	RN60C2492F	
R11	299709-467	1	RESISTOR, 30.1K, 1/8W	RN60C3012F	
R12	299709-421	1	RESISTOR, 10K, 1/8W	RN60C1002F	
R13	299709-466	1	RESISTOR, 29.4K, 1/8W	RN60C2942F	
R14	299709-417	1	RESISTOR, 9.09K, 1/8W	RN60C9091F	
R15	299709-351	2	RESISTOR, 2K, 1/8W	RN60C2001F	
R16	299709-351		RESISTOR, 2K, 1/8W	RN60C2001F	
R17	299709-322		RESISTOR, 1K, 1/8W	RN60C1001F	
R18	299701-101	1	RESISTOR, 100Ω, 1/4W	RC07GF101J	
R19	299701-102	1	RESISTOR, 1K, 1/4W	RC07GF102J	
S1	299358-2	1	SWITCH, ROTARY	299358-2	
1A2A2	296256-1	1	SCAN TIME/DIV SWITCH ASSEMBLY	296256-1	7-8
C1	296559-103	1	CAPACITOR, 0.01μF, 5%	CK05BX103J	
C2	296560-107	1	CAPACITOR, 100μF, 10%	CS13BC107K	
C3			NOT USED		
C4	293861	1	CAPACITOR, 3.3μF, 5%	M39003/01-5020	
CR1	299251-001	2	DIODE	1N4009	
CR2			NOT USED		
CR3	299251-001		DIODE	1N4009	
E1	990203-1	1	TERMINAL, LUG	990203-1	
R1	299709-620	1	RESISTOR, 1.15 MEG, 1/8W	RN60C1154F	
R2	299709-525	1	RESISTOR, 118K, 1/8W	RN60C1183F	
R3	299709-428	1	RESISTOR, 11.8K, 1/8W	RN60C1182F	
R4	299709-520	1	RESISTOR, 105K, 1/8W	RN60C1053F	
R5	299709-471	1	RESISTOR, 33.2K, 1/8W	RN60C3322F	
R6	299709-56	1	RESISTOR, 332K, 1/8W	RN60C3323F	
R7	299709-518	1	RESISTOR, 100K, 1/8W	RN60C1003F	
R8	299709-473	1	RESISTOR, 34.8K, 1/8W	RN60C3482F	
R9	299702-104	1	RESISTOR, 100K, 1/2W	RC20GF104J	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A2A2R10	299709-424	1	RESISTOR, 10.7K, 1/8W	RN60C1072F	7-8
R11	299709-568	1	RESISTOR, 332K, 1/8W	RN60C3323F	
R12	299709-620	1	RESISTOR, 1.15M, 1/8W	RN60C1154F	
R13	299701-511	1	RESISTOR, 510Ω, 1/4W	RC07GF511J	
S1	296126-1	1	SWITCH, ROTARY	296126-1	
1A2A3	299302-3	1	RF RANGE SWITCH ASSEMBLY	299302-3	7-9
R73	299709-396	1	RESISTOR, 5.49K, 1/8W, 1%	RN60C5491F	
R74	299701-823	1	RESISTOR, 82K, 1/4W, 5%	RC07GF823J	
R75	299701-124	1	RESISTOR, 120K, 1/4W, 5%	RC07GF124J	
R85	299709-421	3	RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R86	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R87	299701-102	1	RESISTOR, 1K, 1/4W, 5%	RC07GF102J	
R92	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R93	299709-391	1	RESISTOR, 4.99K, 1/8W, 1%	RN60C4991F	
R94	299709-668	1	RESISTOR, 2.50K, 1/8W, 1%	RN60C2501F	
R95	299701-472	2	RESISTOR, 4.7K, 1/4W, 1%	RC07GF472F	
R96	299701-432	1	RESISTOR, 4.3K, 1/4W, 5%	RC07GF432J	
R97	299701-472		RESISTOR, 4.7K, 1/4W, 1%	RC07GF472F	
S1	299359-1	1	SWITCH, ROTARY	299359-1	
1A2A3A1	299303-1	1	YIG FM TUNING PC BOARD	299303-1	7-9
C1	299244-1	2	CAPACITOR, .01μF	C023F501C103Z	
C2	299244-1		CAPACITOR, .01μF	C023F501C103Z	
R78	299709-421	3	RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R79	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R80	299709-421		RESISTOR, 10K, 1/8W, 1%	RN60C1002F	
R82	299709-351	1	RESISTOR, 2K, 1/8W, 1%	RN60C2001F	
R83	299709-391	1	RESISTOR, 4.99K, 1/8W, 1%	RN60C4991F	
R84	299709-360	1	RESISTOR, 2.49K, 1/8W, 1%	RN60C2491F	
R88	299709-329	1	RESISTOR, 1.18K, 1/8W, 1%	RN60C1181F	
TP1	294243	6	TERMINAL, SOLDER	1558-2-05	
TP2	294243		TERMINAL, SOLDER	1558-2-05	
TP3	294243		TERMINAL, SOLDER	1558-2-05	
TP4	294243		TERMINAL, SOLDER	1558-2-05	
TP5	294243		TERMINAL, SOLDER	1558-2-05	
TP6	294243		TERMINAL, SOLDER	1558-2-05	
Z1	293511	1	INTEGRATED CIRCUIT	SN72741P	
1A2A3A2	295014-2	1	YIG OFFSETS PC BOARD	295014-2	7-9
R22	299709-239	1	RESISTOR, 162Ω, 1/8W, 1%	RN60C1620F	
R23	299745-4	2	RESISTOR, VARIABLE, 100Ω	3009P-1-101	
R24	299709-330	1	RESISTOR, 1.21K, 1/8W, 1%	RN60C1211F	
R25	299709-276	1	RESISTOR, 3.74Ω, 1/8W, 1%	RN60C3740F	
R26	299745-6	8	RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R27	299709-360	1	RESISTOR, 2.49K, 1/8W, 1%	RN60C2491F	
R28	299709-280	1	RESISTOR, 412Ω, 1/8W, 1%	RN60C4120F	
R29	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R30	299709-357	1	RESISTOR, 2.32K, 1/8W, 1%	RN60C2321F	
R31	299709-230	1	RESISTOR, 130Ω, 1/8W, 1%	RN60C1300F	
R32	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R33	299709-362	2	RESISTOR, 2.61K, 1/8W, 1%	RN60C2611F	
R34	299709-222	1	RESISTOR, 107Ω, 1/8W, 1%	RN60C1070F	
R35	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R36	299709-362		RESISTOR, 2.61K, 1/8W, 1%	RN60C2611F	
R37	299709-288	1	RESISTOR, 475Ω, 1/8W, 1%	RN60C4750F	
R38	299745-4		RESISTOR, VARIABLE, 100Ω	3009P-1-101	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A2A3A2R39	299709-333	1	RESISTOR, 1.3K, 1/8W, 1%	RN60C1301F	7-9
R40	299709-305	1	RESISTOR, 681Ω, 1/8W, 1%	RN60C6810F	
R41	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R42	299709-368	1	RESISTOR, 3.01K, 1/8W, 1%	RN60C3011F	
R43	299709-347	1	RESISTOR, 1.82K, 1/8W, 1%	RN60C1821F	
R44	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R45	299709-357	1	RESISTOR, 2.32K, 1/8W, 1%	RN60C2321F	
R46	299709-389	1	RESISTOR, 4.75K, 1/8W, 1%	RN60C4751F	
R47	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R48	299709-350	1	RESISTOR, 1.96K, 1/8W, 1%	RN60C1961F	
R49	299709-405	1	RESISTOR, 6.81K, 1/8W, 1%	RN60C6811F	
R50	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R51	299709-350		RESISTOR, 1.96K, 1/8W, 1%	RN60C1961F	
TP1	294243	2	TERMINAL, SOLDER	1558-2-05	
TP2	294243		TERMINAL, SOLDER	1558-2-05	
1A2A3A3	299304-1	1	YIG GAINS PC BOARD	299304-1	7-9
R4	299709-351	2	RESISTOR, 2K, 1/8W, 1%	RN60C2001F	
R5	299709-351		RESISTOR, 2K, 1/8W, 1%	RN60C2001F	
R6	299709-322	4	RESISTOR, 1K, 1/8W, 1%	RN60C1001F	
R7	299709-322		RESISTOR, 1K, 1/8W, 1%	RN60C1001F	
R8	299709-322		RESISTOR, 1K, 1/8W, 1%	RN60C1001F	
R9	299709-322		RESISTOR, 1K, 1/8W, 1%	RN60C1001F	
R13	299709-368	4	RESISTOR, 3.01K, 1/8W, 1%	RN60C3011F	
R14	299745-6	4	RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R15	299709-346	4	RESISTOR, 1.78K, 1/8W, 1%	RN60C1781F	
R16	299709-368		RESISTOR, 3.01K, 1/8W, 1%	RN60C3011F	
R17	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R18	299709-346		RESISTOR, 1.78K, 1/8W, 1%	RN60C1781F	
R19	299709-368		RESISTOR, 3.01K, 1/8W, 1%	RN60C3011F	
R20	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R21	299709-346		RESISTOR, 1.78K, 1/8W, 1%	RN60C1781F	
R89	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R90	299709-368		RESISTOR, 3.01K, 1/8W, 1%	RN60C3011F	
R91	299709-346		RESISTOR, 1.78K, 1/8W, 1%	RN60C1781F	
TP1	294243	2	TERMINAL, SOLDER	1558-2-05	
TP2	294243		TERMINAL, SOLDER	1558-2-05	
1A2A3A4	231028-2	1	DIGITAL DISPLAY PC BOARD	231028-2	7-9
R10	299745-6	5	RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R11	299709-547	1	RESISTOR, 200K, 1/8W, 1%	RN60C2003F	
R12	299709-376	5	RESISTOR, 3.65K, 1/8W, 1%	RN60C3651F	
R52	299745-8	2	RESISTOR, VARIABLE, 2K	3009P-1-202	
R53	299709-398	1	RESISTOR, 5.76K, 1/8W, 1%	RN60C5761F	
R54	299745-9	1	RESISTOR, VARIABLE, 5K	3009P-1-502	
R55	299709-418	1	RESISTOR, 9.31K, 1/8W, 1%	RN60C9311F	
R56	299745-10	2	RESISTOR, VARIABLE, 10K	3009P-1-103	
R57	299709-409	1	RESISTOR, 7.5K, 1/8W, 1%	RN60C7501F	
R58	299745-10		RESISTOR, VARIABLE, 10K	3009P-1-103	
R59	299709-454	1	RESISTOR, 22.1K, 1/8W, 1%	RN60C2212F	
R60	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R61	299709-523	1	RESISTOR, 113K, 1/8W, 1%	RN60C1133F	
R62	299709-376		RESISTOR, 3.65K, 1/8W, 1%	RN60C3651F	
R63	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	
R64	299709-506	1	RESISTOR, 75K, 1/8W, 1%	RN60C7502F	
R65	299709-376		RESISTOR, 3.65K, 1/8W, 1%	RN60C3651F	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A2A3A4R66	299745-6		RESISTOR, VARIABLE, 500Ω	3009P-1-501	7-9
R67	299709-492	1	RESISTOR, 53.6K, 1/8W, 1%	RN60C5362F	
R68	299709-376		RESISTOR, 3.65K, 1/8W, 1%	RN60C3651F	
R69	299745-6		RESISTOR, VARIABLE, 500%	3009P-1-501	
R70	299709-469	1	RESISTOR, 31.6K, 1/8W, 1%	RN60C3162F	
R71	299709-376		RESISTOR, 3.65K, 1/8W, 1%	RN60C3651F	
R72	299745-8		RESISTOR, VARIABLE, 2K	3009P-1-202	
R81	299709-403	1	RESISTOR, 6.49K, 1/8W, 1%	RN60C6491F	
TP1	294243	3	TERMINAL, SOLDER	1558-2-05	
TP2	294243		TERMINAL, SOLDER	1558-2-05	
TP3	294243		TERMINAL, SOLDER	1558-2-05	
1A2A4	295898-2	1	IF BANDWIDTH SWITCH ASSEMBLY	295898-2	7-10
S1	295829-1	1	ROTARY SWITCH	295829-1	
1A2A5	295821-2	1	VERTICAL SCALE SWITCH ASSEMBLY	295821-2	7-11
R1	299709-150	1	RESISTOR, 45.3Ω, 1/8W	RN60C45R3F	
R2	299709-252	1	RESISTOR, 221Ω, 1/8W	RN60C2210F	
S1	295806-1	1	SWITCH, ROTARY	295806-1	
1A2A6	296257-1	1	SCAN MODE SWITCH ASSEMBLY	296257-1	7-12
C1	293721	1	CAPACITOR, 430μF, 8V	109D437X008T2	
E1	990203-1	2	TERMINAL, LUG	990203-1	
E2	990203-1		TERMINAL, LUG	990203-1	
R2	299701-201	1	RESISTOR, 200Ω, 1/4W	RC07GF201J	
S1	296023-1	1	SWITCH, ROTARY	296023-1	
1A2A7	296310-1	1	CALIBRATE INDICATOR ASSEMBLY	296310-1	
CR1	296248-3	1	DIODE	HLMP-1301-4684	
E1	293320-2	3	TERMINAL, STUD	293320-2	
E2	293320-2		TERMINAL, STUD	293320-2	
E3	293320-2		TERMINAL, STUD	293320-2	
R10	299701-132	1	RESISTOR, 1.3K, 1/4W	RC07GF132J	
1A2A8	296230-1	1	BANDWIDTH PC BOARD ASSEMBLY	296230-1	7-13
CR1	296248-2	6	DIODE, LED	1401(-4584)	
CR2	296248-2		DIODE, LED	1401(-4584)	
CR3	296248-3	1	DIODE, LED	1501(4984)	
CR4	299251-901	4	DIODE	1N4009	
CR5	299251-901		DIODE	1N4009	
CR6	299251-901		DIODE	1N4009	
CR7	299251-901		DIODE	1N4009	
CR8	296248-2		DIODE	1401(-4584)	
CR9	296248-2		DIODE	1401(-4584)	
CR10	296248-2		DIODE	1401(-4584)	
CR11	296248-2		DIODE	1401(-4584)	
J1	299934-3	1	CONNECTOR, HEADER, 20 PIN	1-87227-0	
R1	299700-241	7	RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R2	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R3	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R4	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R5	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R6	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R7	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
S1	296288-1	1	SWITCH, SLIDE, 4PDT	MSS4200	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A2A9	296232-1	1	PUSHBUTTON SWITCH ASSEMBLY, 5 FUNCTION	296232-1	7-14
CR1	296258-1	5	DIODE, LED	296258-1	
CR2	296258-1		DIODE, LED	296258-1	
CR3	296258-1		DIODE, LED	296258-1	
CR4	296258-1		DIODE, LED	296258-1	
CR5	296258-1		DIODE, LED	296258-1	
J1	299934-3	1	CONNECTOR, HEADER, 20 PIN	1-87227-0	
R1	299700-241	5	RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R2	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R3	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R4	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R5	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
S1	296247-3	5	SWITCH, PUSHBUTTON	PB17-5	
S2	296247-3		SWITCH, PUSHBUTTON	PB17-5	
S3	296247-3		SWITCH, PUSHBUTTON	PB17-5	
S4	296247-3		SWITCH, PUSHBUTTON	PB17-5	
S5	296247-3		SWITCH, PUSHBUTTON	PB17-5	
1A2A10	296234-1	1	PUSHBUTTON SWITCH ASSEMBLY, 4 FUNCTION	296234-1	7-15
C1	293721	2	CAPACITOR, 430μF,8V	109D437X0008T2	
C2	115307-10	2	CAPACITOR, 100μF	TE1211	
C3	293721		CAPACITOR, 430μF,8V	109D437X0008T2	
C4	115307-10		CAPACITOR, 100μF	TE1211	
E1	293050-1	1	TERMINAL	61137-1	
J1	299935-1	1	CONNECTOR, HEADER, 16 PIN	87230-8	
J2	294213-1	1	CONNECTOR, HEADER, 10 PIN	87230-5	
J3	294454-1	1	CONNECTOR, HEADER, 36 PIN	87230-8	
R1	299700-241	4	RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R2	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R3	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R4	299700-241		RESISTOR, 240Ω, 1/8W, 5%	RC05GF241J	
R5	299702-560	2	RESISTOR, 56Ω, 1/2W	RC20GF560J	
R6	299702-560		RESISTOR, 56Ω, 1/2W	RC20GF560J	
S1	296247-2	4	SWITCH, PUSHBUTTON	296247-2	
S2	296247-2		SWITCH, PUSHBUTTON	296247-2	
S3	296247-2		SWITCH, PUSHBUTTON	296247-2	
S4	296247-2		SWITCH, PUSHBUTTON	296247-2	
1A2A11	296026-1	1	FREQUENCY READOUT PC BOARD ASSEMBLY	296026-1	7-16
J2	299932	2	CONNECTOR, HEADER, 26 PIN	1-87227-3	
J3	299932		CONNECTOR, HEADER, 26 PIN	1-87227-3	
XZ1	294573-1	5	SOCKET, 14 PIN	C931410	
XZ2	294573-1		SOCKET, 14 PIN	C931410	
XZ3	294573-1		SOCKET, 14 PIN	C931410	
XZ4	294573-1		SOCKET, 14 PIN	C931410	
XZ5	294573-1		SOCKET, 14 PIN	C931410	
Z1	293212-1	5	LED DISPLAY	5082-7730	
Z2	293212-1		LED DISPLAY	5082-7730	
Z3	293212-1		LED DISPLAY	5082-7730	
Z4	293212-1		LED DISPLAY	5082-7730	
Z5	293212-1		LED DISPLAY	5082-7730	
1A2A12	299137-2	1	TUNER ASSEMBLY	299137-2	7-17
CL1	293300	2	TERMINAL	011-2000-000-479	
CL2	293300		TERMINAL	011-2000-000-479	
CR1	299251-1	2	DIODE	1N4009	

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A2A12CR2	299251-1		DIODE	1N4009	7-17
E1	293317	1	TERMINAL	4862-1-0519	
P1	299946	1	CONNECTOR, 10 PIN	1-86148-2	
R1	299793	1	POTENTIOMETER, 5K	3400S-1-502	
R2	294753-2	1	POTENTIOMETER, 5K	8146-R5K-L.25SS	
R3	299701-512	1	RESISTOR, 5.1K, 1/4W	RC07GF512J	
1A2A13	295858-3	1	IF ATTENUATOR ASSEMBLY	295858-3	7-18
P3	294410	1	CONNECTOR	86905-1	
W1	294881		CABLE	455-044-26	
1A2A14	295835-2	1	RF ATTENUATOR ASSEMBLY	295835-2	7-19
MP1	293648	1	SWITCH, ROTARY	71B36-01-1-10N-F	
MP2	294179	1	COUPLING, FLEXIBLE	A-201-5 TINY MITE	
MP3	295668	1	SHAFT	295668	
1A2A15	299735-1	1	SIGNAL CENTER ASSEMBLY	299735-1	7-6
1A2A16	299364-1	1	BASELINE/CONTRAST ASSEMBLY	299364-1	7-6
1A2A17	296152-1	1	CONTROL PANEL ASSEMBLY	296152-1	7-6
1A2A18	231079-1	1	RF SWITCH	919C74700	7-6
1A3	296252-1	1	REAR PANEL ASSEMBLY	296252-1	3-2
B1	294977-1	1	FAN, AXIAL	M747	
FL1	294695	1	FILTER, LINE	6J4	
J1	294336	8	CONNECTOR, BNC	UG1094U/Z	
J2	294336		CONNECTOR, BNC	UG1094U/Z	
J3	294336		CONNECTOR, BNC	UG1094U/Z	
J4	294336		CONNECTOR, BNC	UG1094U/Z	
J5	294336		CONNECTOR, BNC	UG1094U/Z	
J6	294336		CONNECTOR, BNC	UG1094U/Z	
J7	293063	1	HOLE PLUG	653	
J8	294336		CONNECTOR, BNC	UG1094U/Z	
J9	294336		CONNECTOR, BNC	UG1094U/Z	
J10	298505-115	1	CABLE ASSEMBLY		
J11			NOT USED		
J12	298505-117	1	CABLE ASSEMBLY	250-3953	
MP1	294947	1	PLUG AND CORD	16-415	
1A3A1	296004-902	1	HEAT SINK ASSEMBLY	296004-902	3-2
1A4	296004-901	1	LOW VOLTAGE POWER SUPPLY	296004-901	7-20
C1		1	CAPACITOR, 14K, 20V	CGS1434020R3L3PH	
C2		2	CAPACITOR, 3700, 35V	CGS3724035N3L3PS	
C3			CAPACITOR, 3700, 35V	CGS3724035N3L3PS	
C5		1	CAPACITOR, 2K, 60V	CGS2024060N3L3PS	
Q5		1	TRANSISTOR	TIP-121	
S1		1	SWITCH, THERMAL	SW701	
T1		1	TRANSFORMER	T1213A	
TB1		1	TERMINAL BLOCK, 6 PIN	6003/4ST-6	
TB2		1	TERMINAL BLOCK, 9 PIN	1031-9	
1A4A1		1	PC BOARD	218A	7-20
C6		8	CAPACITOR, .01, 80V		
C7			CAPACITOR, .01, 80V		

Table 8-2. Replaceable Parts List (Continued)

Reference Designation	AILTECH Part Number	Qty	Description	Mfr Part Number	Figure No.
1A4A1C8		4	CAPACITOR, TANTALUM 15, 20V		7-20
C9		1	CAPACITOR, AXIAL 100, 16V		
C10			CAPACITOR, .01, 80V		
C11			CAPACITOR, .01, 80V		
C12			CAPACITOR, TANTALUM 15, 20V		
C13		2	CAPACITOR, AXIAL 22, 25V		
C14			CAPACITOR, .01, 80V		
C15			CAPACITOR, .01, 80V		
C16			CAPACITOR, TANTALUM 15, 20V		
C17			CAPACITOR, AXIAL 22, 25V		
C18			CAPACITOR, .01, 80V		
C19			CAPACITOR, .01, 80V		
C20			CAPACITOR, TANTALUM 15, 20V		
C21			CAPACITOR, AXIAL 22, 40V		
C22			CAPACITOR, .1, 25V		
C23			CAPACITOR, TANTALUM 3.3, 15V		
C24			CAPACITOR, TANTALUM 3.3, 15V		
CR18		1	DIODE, ZENER	1N749A	
CR19		8	DIODE	1N4004	
CR20			DIODE	1N4004	
CR21		1	DIODE, ZENER	1N967B	
CR22			DIODE	1N4004	
CR23			DIODE	1N4004	
CR24			DIODE, ZENER	1N967B	
CR25			DIODE	1N4004	
CR26			DIODE	1N4004	
CR27		1	DIODE, ZENER	1N970A	
CR28			DIODE	1N4004	
CR29			DIODE	1N4004	
A4Q1		3	TRANSISTOR	2N6385	
Q2	294131	1	TRANSISTOR	2N3053	
Q3			TRANSISTOR	2N6385	
Q4			TRANSISTOR	2N6385	
R1			RESISTOR		
R2		2	RESISTOR, 4.7K		
R3		5	RESISTOR, 1K, 1/4W		
R4		4	RESISTOR, 22K, 1/4W		
R5			RESISTOR, 1K, 1/4W		
R6			RESISTOR		
R7		1	RESISTOR, 0.1Ω, 3W		
R8			RESISTOR, 2.2K, 1/4W		
R9		7	RESISTOR, 2.2K, 1/4W		
R10		4	RESISTOR, 3.01K		
R11		8	POTENTIOMETER, 1K	PT10H2.5	
R12		1	RESISTOR, 866Ω		
R13			RESISTOR, 4.7K, 1/4W		
R14			POTENTIOMETER, 1K	PT10H2.5	
R15		1	RESISTOR, 2.7K, 1/4W		
R16		4	RESISTOR, 470Ω, 1/4W		
R17			RESISTOR		
R18		3	RESISTOR, 10K, 1/4W		
R19		1	RESISTOR, 270Ω, 1/4W		
R20			RESISTOR, 22K, 1/4W		
R21			RESISTOR, 1K, 1/4W		
R22		1	RESISTOR, 0.2Ω, 3W		

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